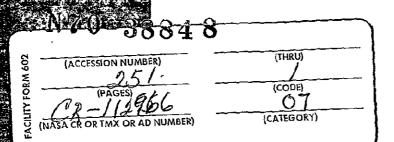
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Draft Final Report

THEORETICAL ANALYSIS OF DIPOLE ANTENNA CHARACTERISTICS
ON THE RAE SATELLITE

Part 2 TCI No. 2236

Contract 'NAS5-11256

Prepared for

National Aeronautics and Space Administration Goddard Space Flight Center Greenbelt, Maryland 20771

By `

Technology for Communications International 1625 Stierlin Road Mountain View, California 94040

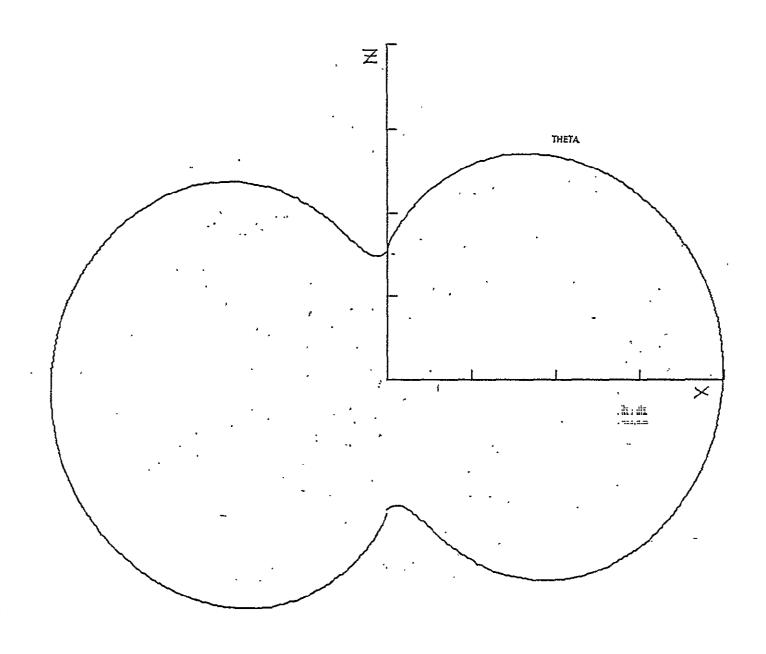
APPENDIX B

PRINCIPAL-PLANE RADIATION PATTERNS FOR DIPOLE IN PRESENCE OF V-ANTENNAS AND LIBRATION DAMPER

The patterns presented in this Appendix are found, in general, in groups of six, representing the three principal planes and the two excitation modes. Within each such 'group, all patterns have been normalized to the same value. Absence of one or more members of a group indicates that no features were visible in that plane and mode on the scale used. Maximum and minimum dB values on each plot indicate the range of gain represented by the scales. One scale division in all cases represents 5 dB.

The patterns have been stamped as being of either theta or phi polarization. These designations refer to a spherical coordinate system whose axis coincides in the conventional way with the Z-axis. Theta polarization means an electric vector parallel to a meridian of longitude, and phi means that the electric vector lies along a parallel of latitude.

NOTE: B-1 through B-100 are for the long V
B-101 through B-195 are for the short V



FREQUENCY (MHZ) -202 V-ANT. LENGTH (FT) 750 MODE BALANCED DB MAX -21.3 DB MIN -41.3

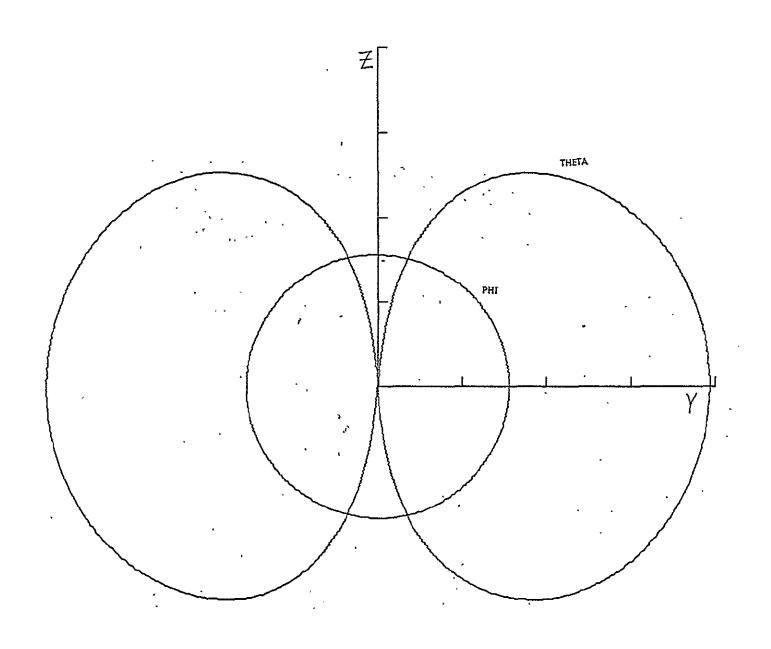


FIGURE B-2

FREQUENCY (MHZ) .202

V-ANT. LENGTH (FT) 750

MODE BALANCED

DB MAX -21.3

DB MIN -41.3

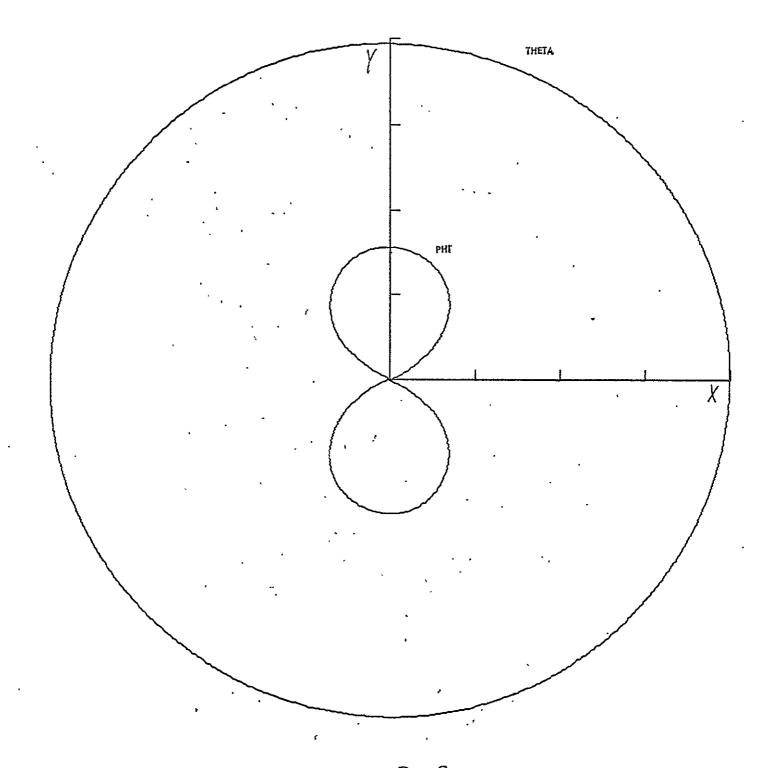


FIGURE B-3

FREQUENCY [MHZ] .202

V-ANT. LENGTH (FT) 750

MODE BALANCED

DB MAX -21.3

DB MIN -41.3

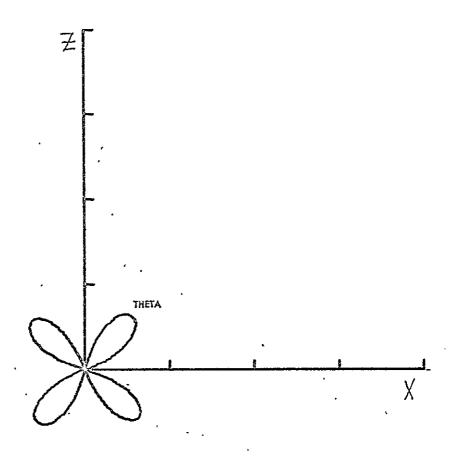


FIGURE B-4

FREQUENCY (MHZ) -202

V-ANT. LENGTH (FT) 950

MODE UNBALANCED

DB MAX -21.3

DB MIN -41.3

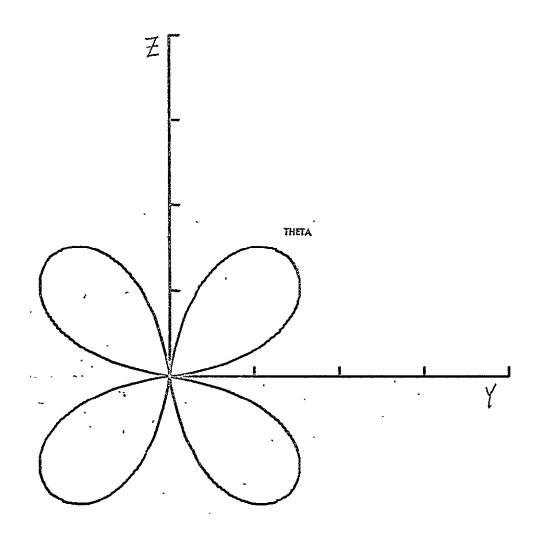


FIGURE B-5

FREQUENCY (MHZ) .202

V-ANT. LENGTH (FT) 750

MODE UNBALANCED

DB MAX -21.3.

DB MIN -41.3

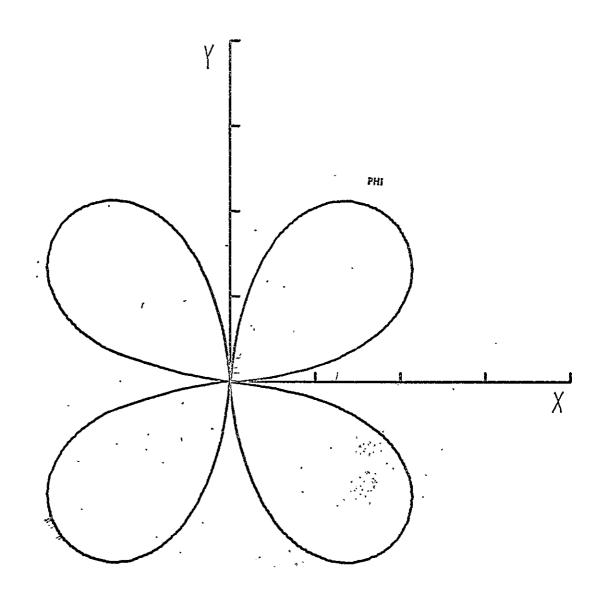


FIGURE B-6

FREQUENCY (MHZ) .2.02

V-ANT. LENGTH (FT) 750

MODE UNBALANCED

DB MAX -21.3

DB MIN -41.3

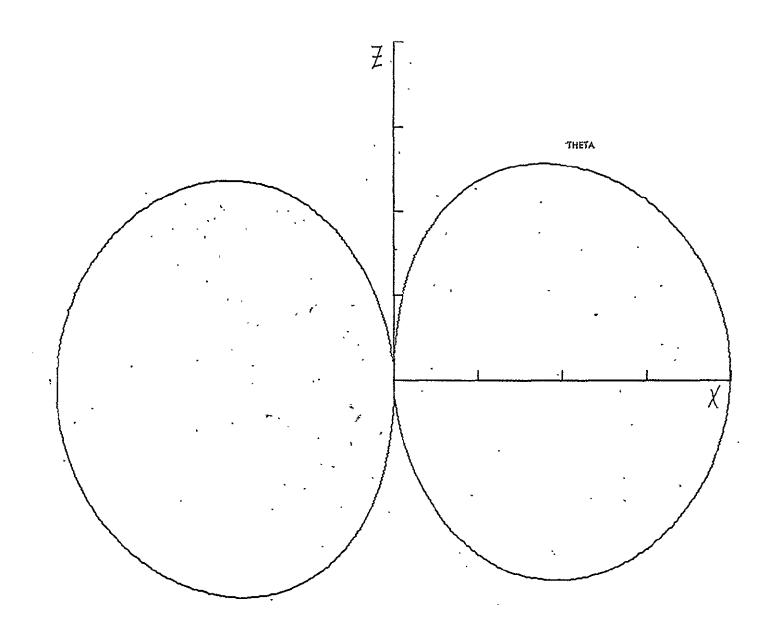


FIGURE B-7
FREQUENCY [MHZ] .311
V-ANT. LENGTH [FT] 250
MODE BALANCED
DB MAX - 8.7
DB MIN - 28.7

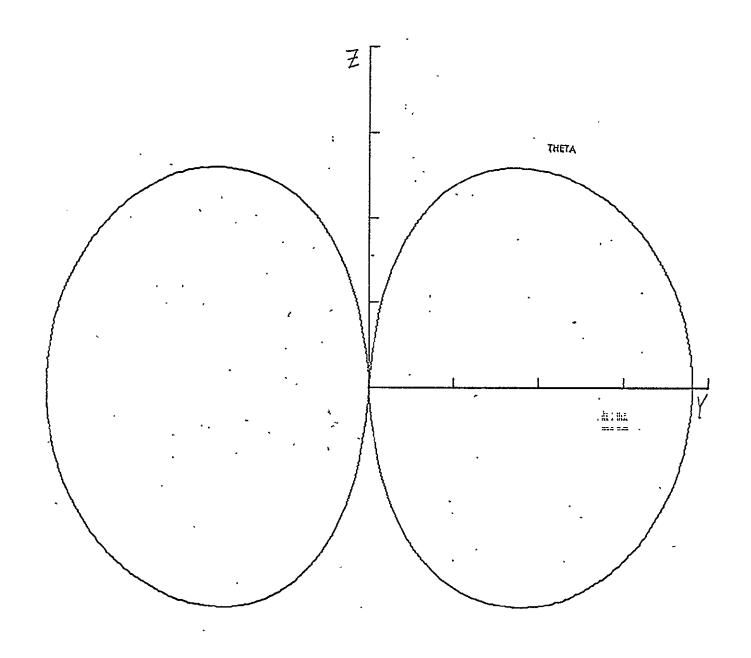


FIGURE B-8

FREQUENCY (MHZ) .311

V-ANT. LENGTH (FT) \$50

MODE BALANCED

DB MAX -8.7

DB MIN -28.7

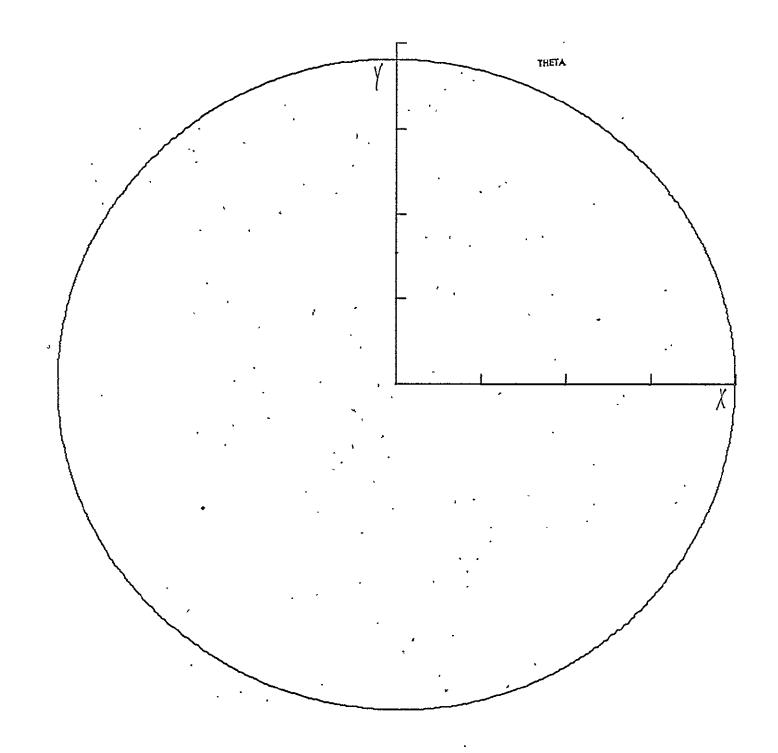


FIGURE B-9
FREQUENCY (MHZ) -311
V-ANT. LENGTH (FT) 950
MODE BALANCED
DB MAX -8.7
DB MIN -28.7

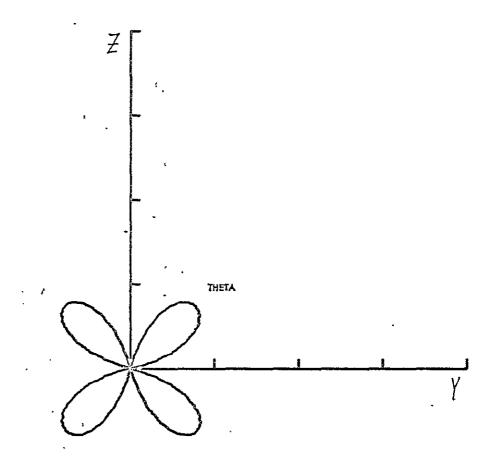


FIGURE B-10

F.EQUENCY [MHZ] .311

V-ANT. LENGTH [FT] \$50

MODE UNBALANCED

DB MAX -8.7

DB MIN -28.7

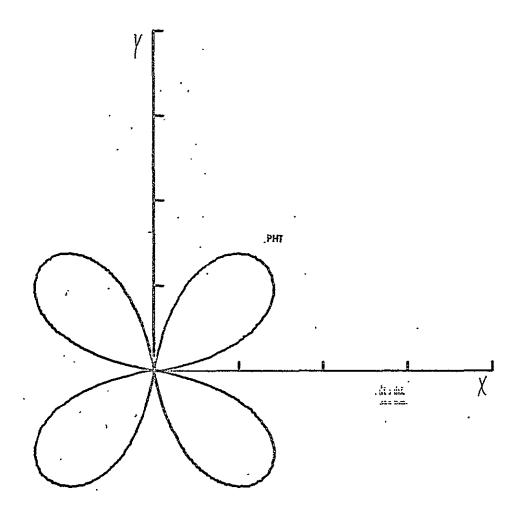


FIGURE B-//
FREQUENCY (MHZ) .311
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX -8.7
DB MIN -28.7

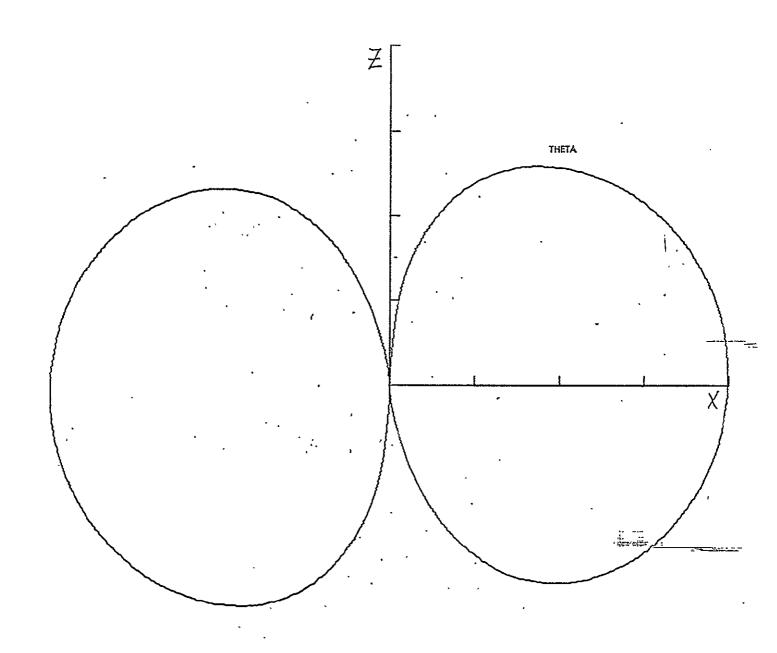


FIGURE B-12

FREQUENCY [MHZ] .369

V-ANT. LENGTH (FT) 950

MODE BALANCED

DB MAX -3.5

DB MIN -23.5

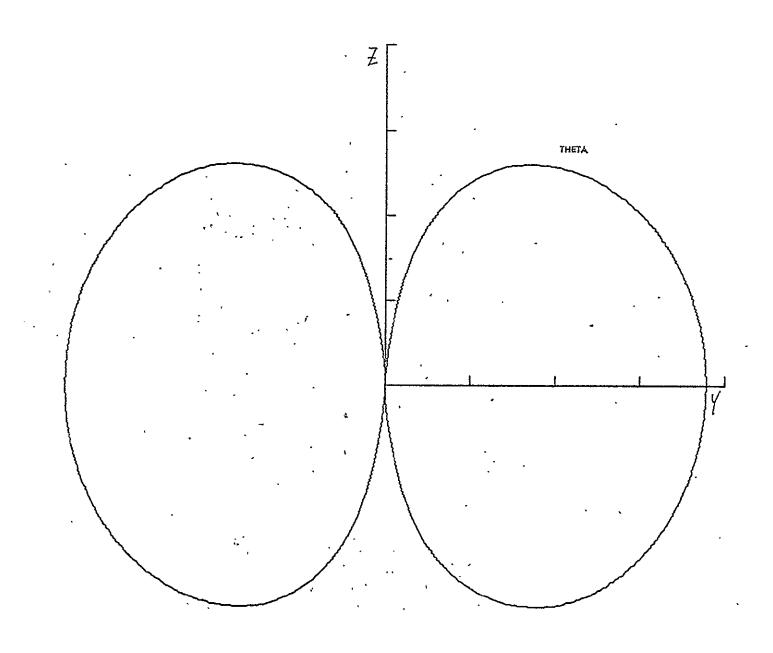
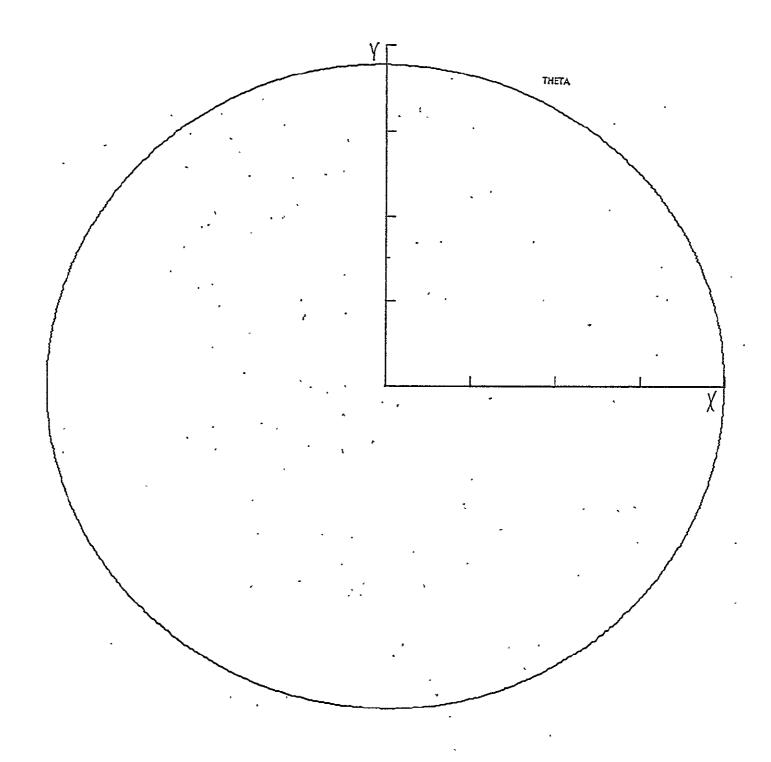


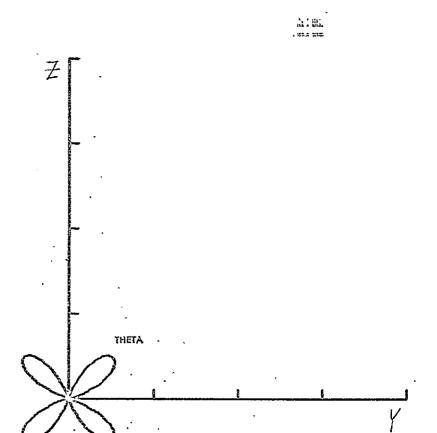
FIGURE B-13

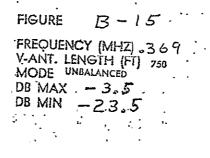
FREQUENCY [MHZ] .369
V-ANT. LENGTH (FT) 750

MODE BALANCED
DB MAX -3.5
DB MIN -23.5



FREQUENCY (MHZ) .369 V-ANT. LENGTH (FT) 250 NIODE BALANCED DB MAX -3.5 DB MIN -23.5





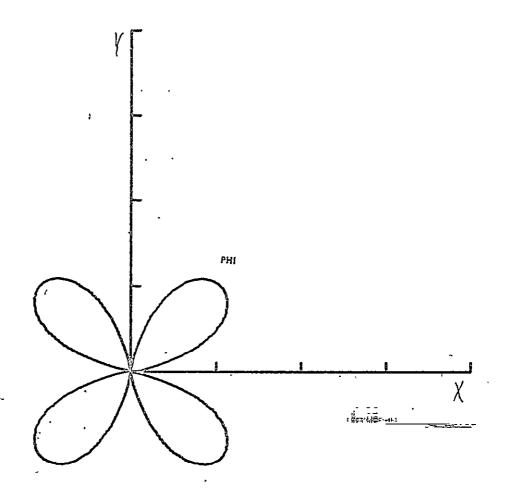


FIGURE B-16

FREQUENCY (MHZ) .369

V-ANT. LENGTH (FT) 750

MODE UNBALANCED

DB MAX -3.5

DB MIN -23.5

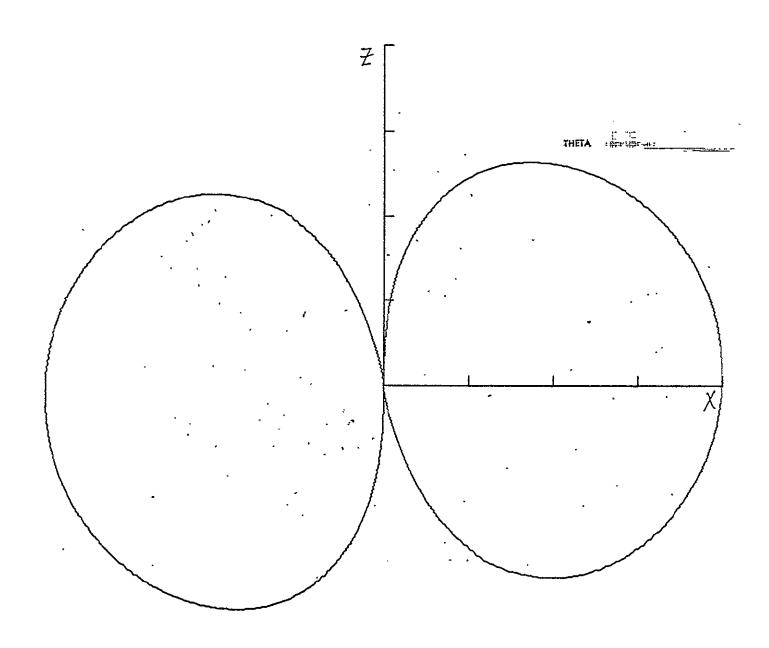


FIGURE B-17

FREQUENCY (MHZ) .450
V-ANT. LENGTH (FT) 550
MODE BALANCED
DB MAX -2.1
DB MIN -22.1

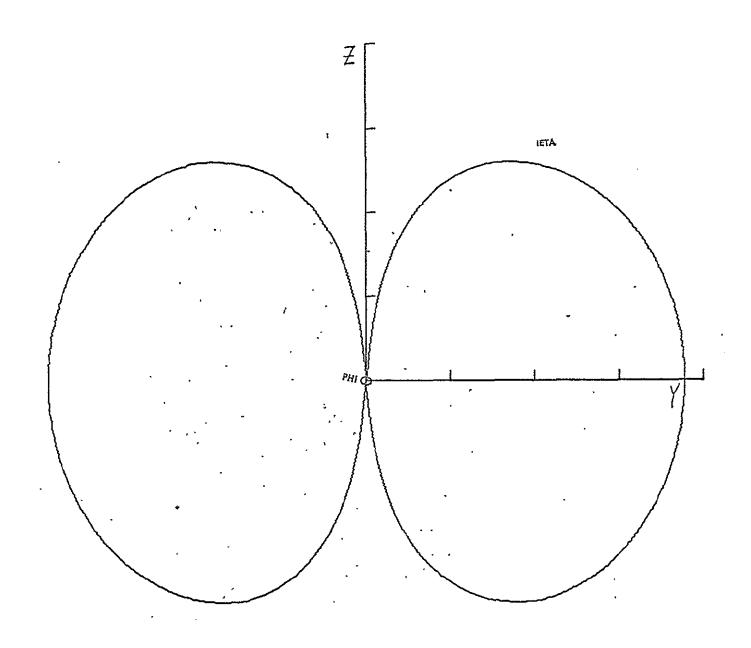


FIGURE B-18

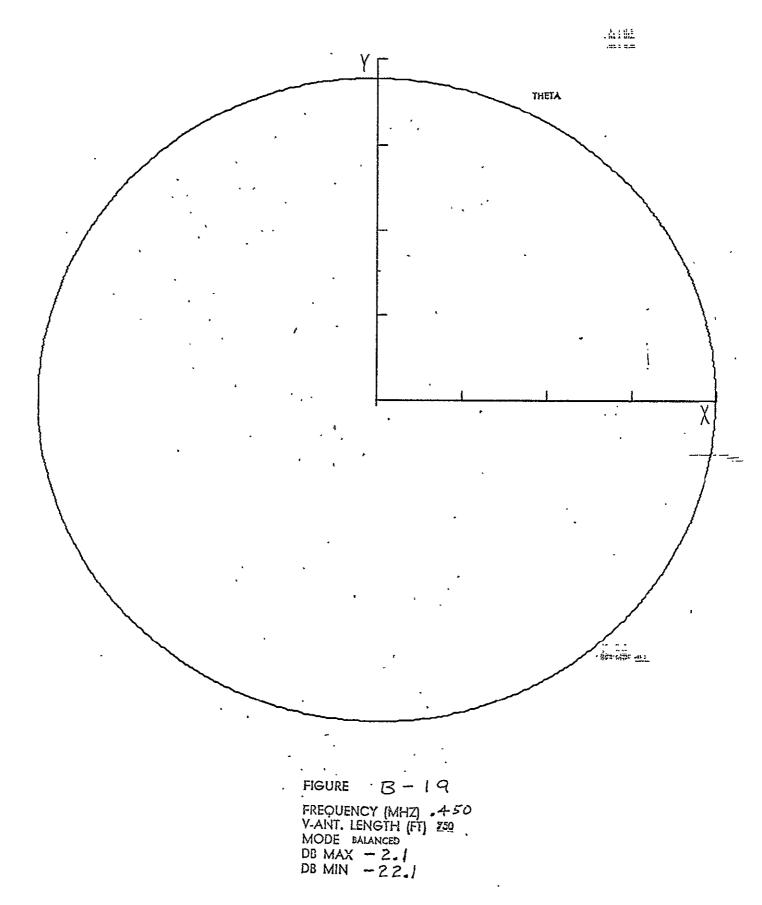
FREQUENCY [MHZ] .450

V-ANT. LENGTH [FT] 750

MODE BALANCED

DB MAX - 2.1

DB MIN -22.1



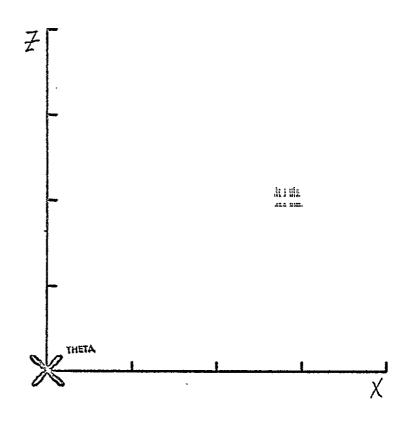


FIGURE 3-20

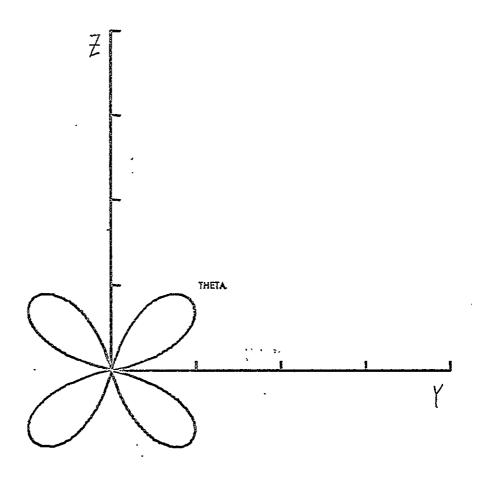
FREQUENCY (MHZ):450

V-ANT. LENGTH (FT) 750

MODE UNBALANCED

DB MAX -2.1

DB MIN -22.1



```
FIGURE B-21

FREQUENCY (MHZ) .450

V-ANT. LENGTH (FT) 750

MODE UNBALANCED.

DB MAX - 2.1

DB MIN -22.1
```

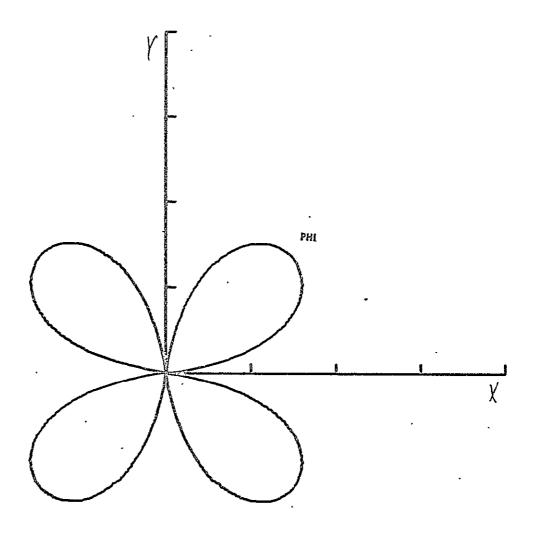
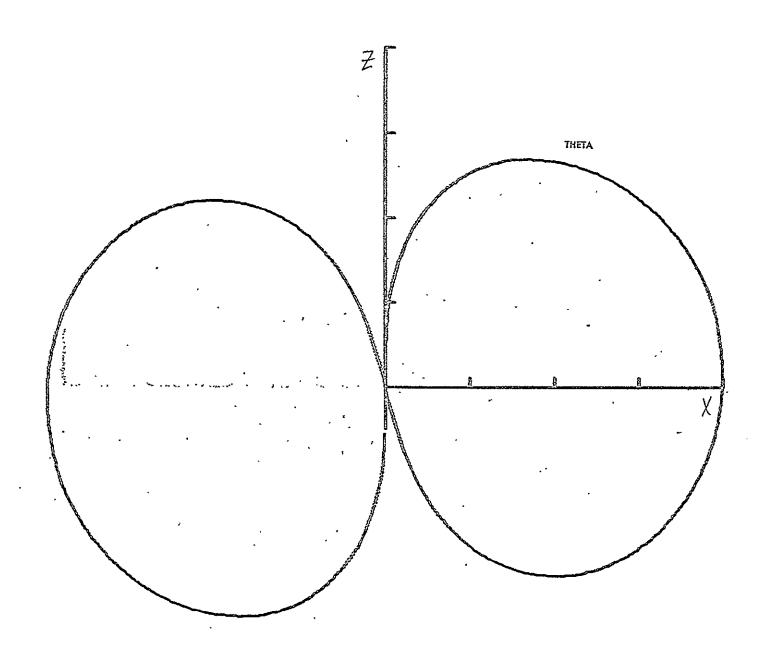


FIGURE B-22

FREQUENCY (MHZ) .450
V-ANT. LENGTH (FT)
MODE UNBALANCED
DB MAX -2,1
DB MIN -22.1



FREQUENCY (MHZ) .540 V-ANT. LENGTH (FT) 950 MODE BALANCED DB MAX -2.8 DB MIN -22.8

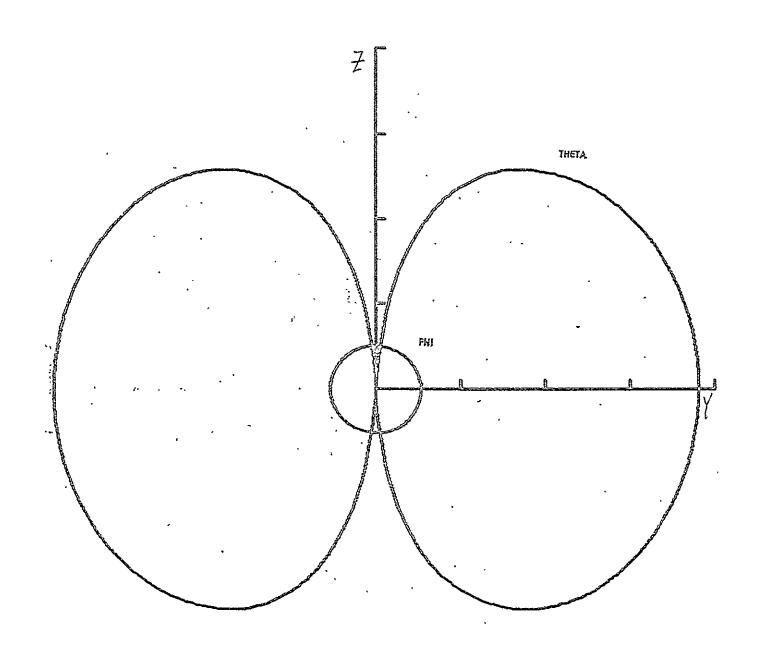


FIGURE B-24
FREQUENCY (MHZ) .540
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX -2.8
DB MIN -22.8

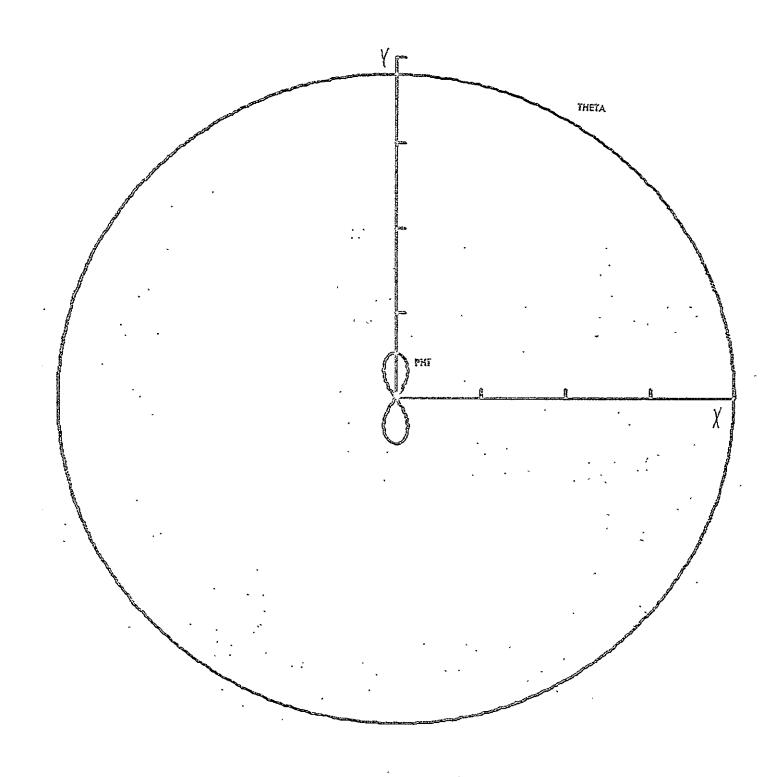


FIGURE B-25

FREQUENCY (MHZ) .540

V-ANT. LENGTH (FT) 950

MODE BALANCED

DB MAX -2.8

DB MIN -22.8

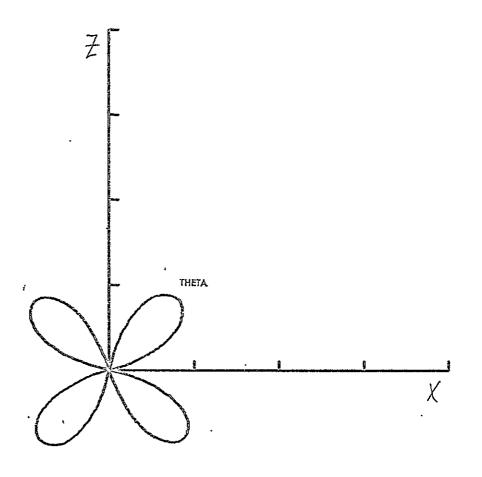


FIGURE 13-26

FREQUENCY (MHZ) .540

V-ANT. LENGTH (FT) 750

MODE UNBALANCED

DB MAX -2.8

DB MIN -22.8

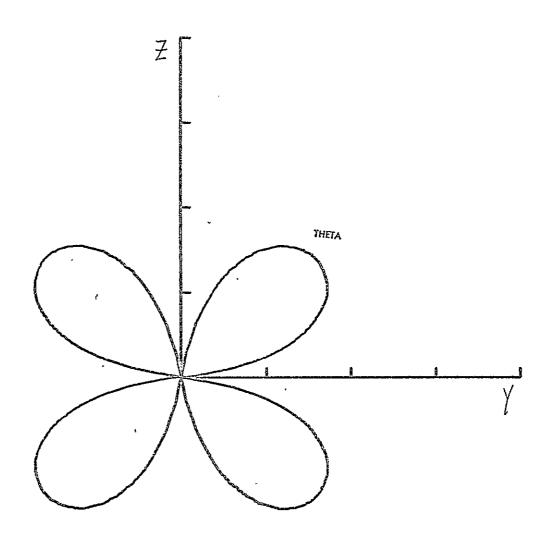


FIGURE 13-27

FREQUENCY (MHZ) .540

V-ANT. LENGTH (FT) 750

MODE UNBALANCED

DB MAX -2.8

DB MIN -22.8

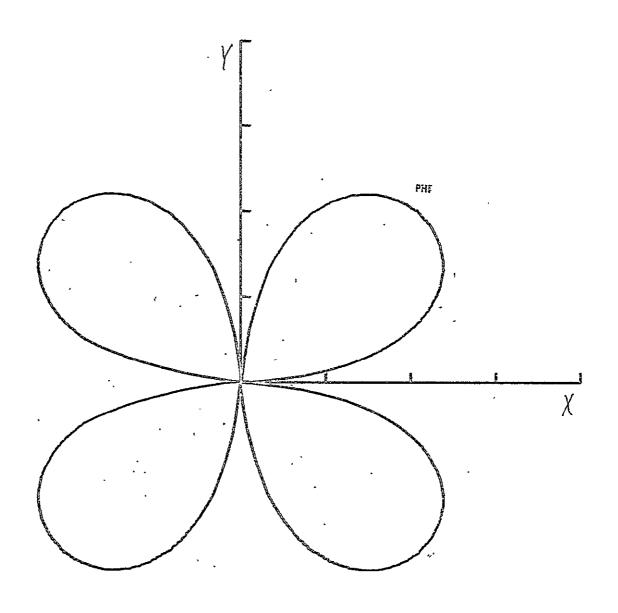


FIGURE B-28

FREQUENCY (MHZ) .540

V-ANT. LENGTH (FT) 750

MODE UNBALANCIL

DB MAX -2.8

DB MIN -22.8

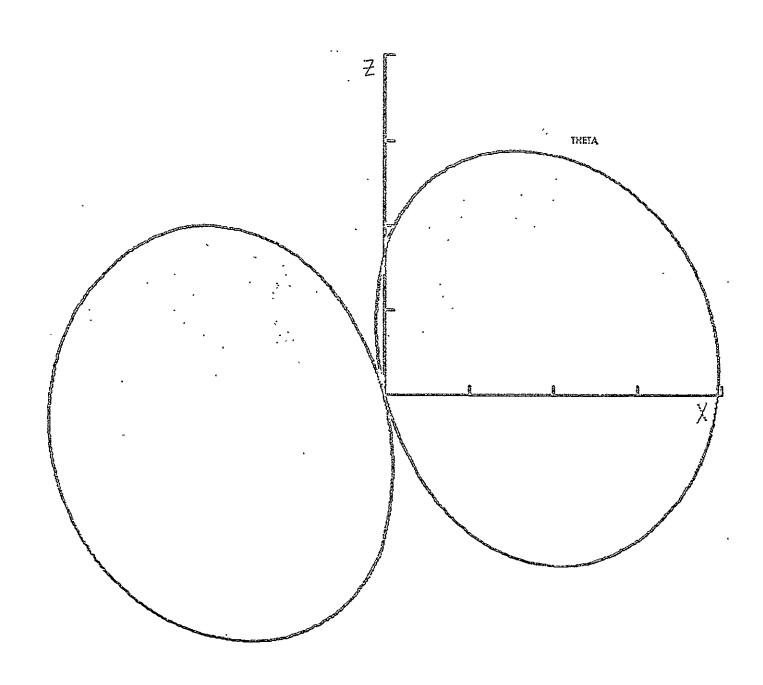


FIGURE B-29
FREQUENCY (MHZ) .700
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX -2.6
DB MIN -22.8

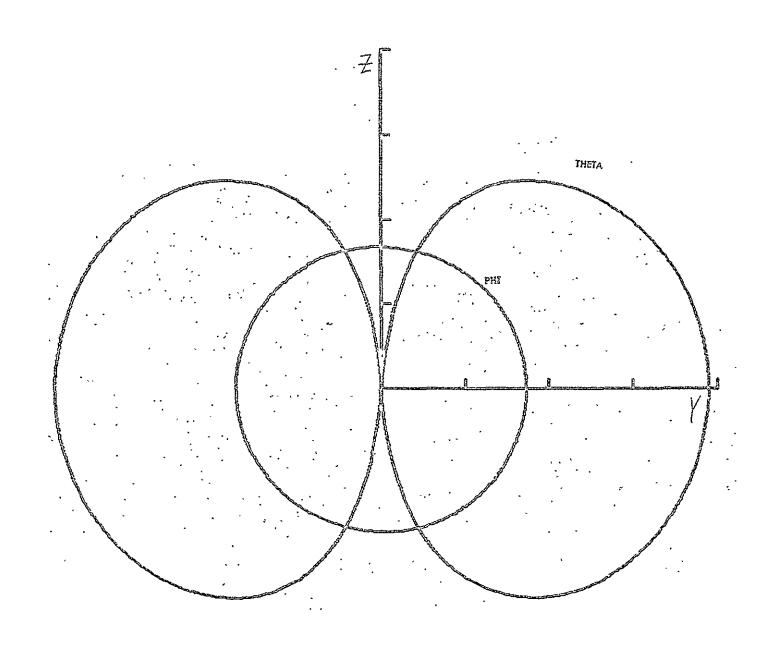


FIGURE B-30
FREQUENCY (MHZ) .700
Y-ANT. LENGTH (FT) 259
MODE BALANCED
DB MAX -2.8
DB MIN -22.8

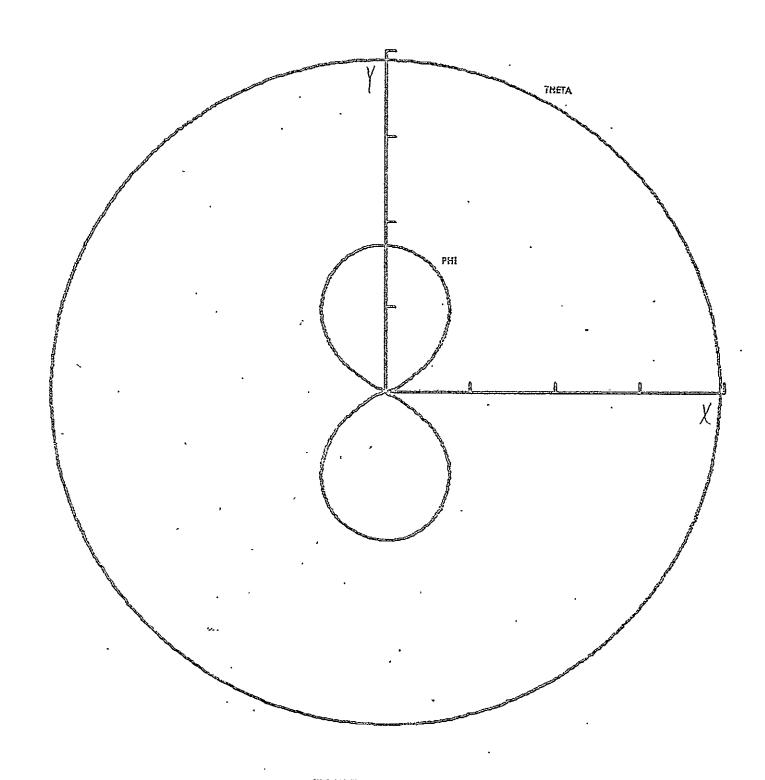


FIGURE 8-31
FREQUENCY (MHZ) .700
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX -2.8
DB MIN -22.8

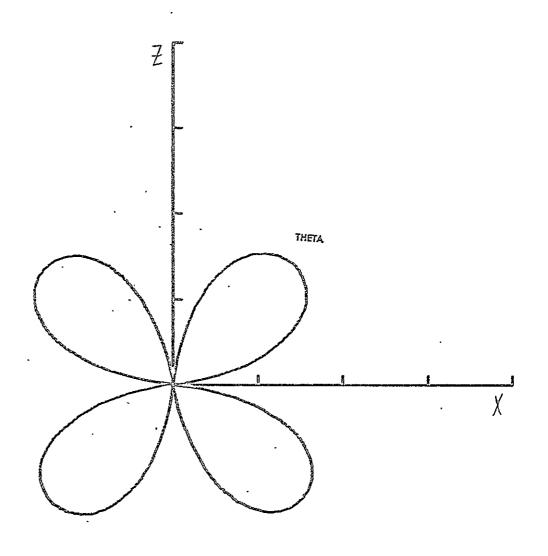


FIGURE 13-32

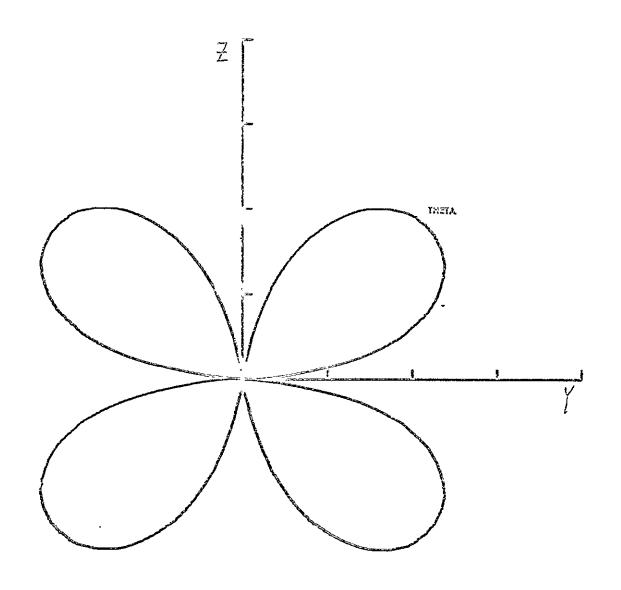
FREQUENCY (MHZ) .700

V-ANT. LENGTH (FT) 750

MODE UNBALANCED

DB MAX -2.8

DB MIN -22.8



FREQUENCY (MHZ) .700 V-ANT. LENGTH (FT) 750 MODE UNDALIANCED DO MAX — 2.8 DO MAN — 22.8

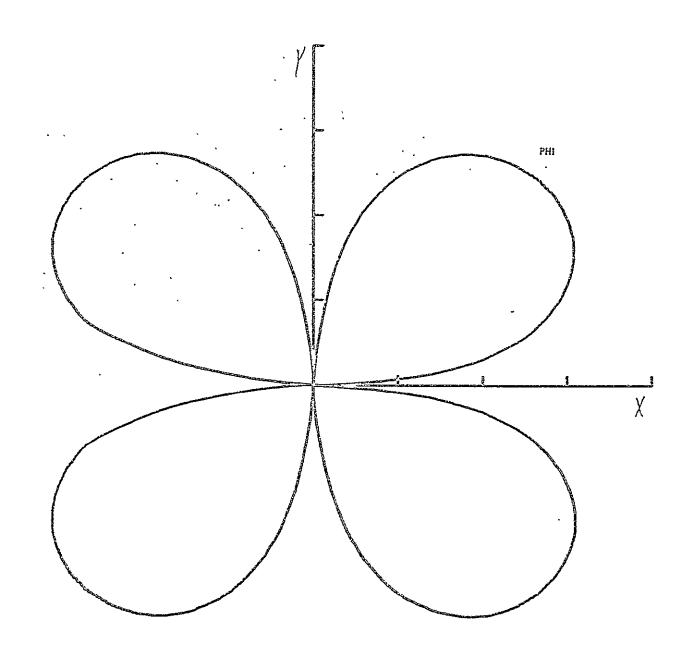


FIGURE B-34
FREQUENCY (MHZ) .700
V-ANT. LENGTH (FT)
MODE UNBALANCED
DB MAX -2.8
DB MIN -22.8

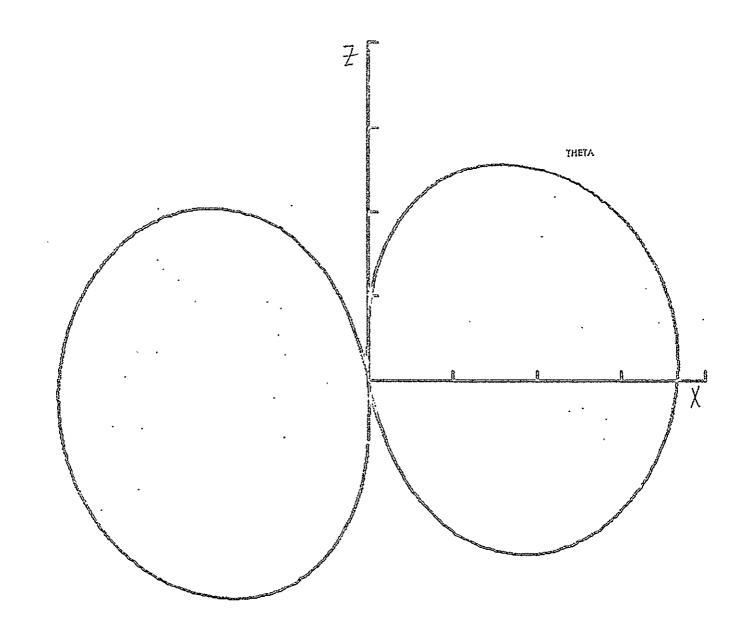


FIGURE B-35
FREQUENCY (MHZ) .900
V-ANT. LENGTH (FT) 759
MODE BALANCED
DB MAX -0.5
DB MIN -20.5

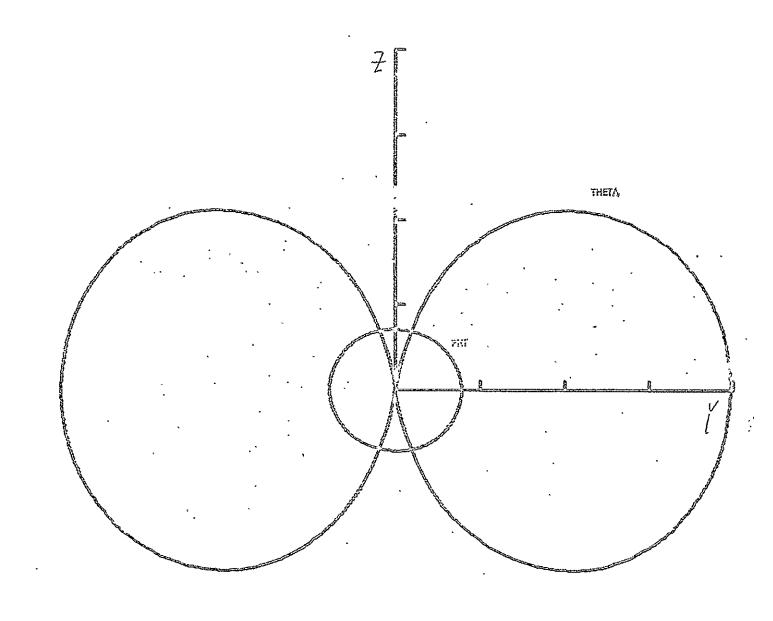


FIGURE B-36

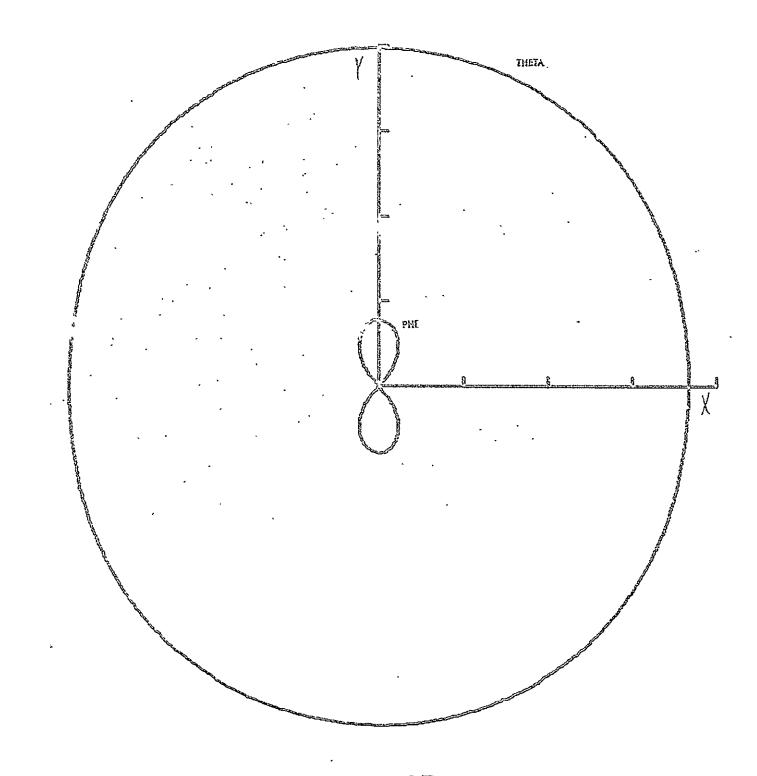
FREQUENCY (MHZ) .900

V-ANT. LENGTH (FT) 750

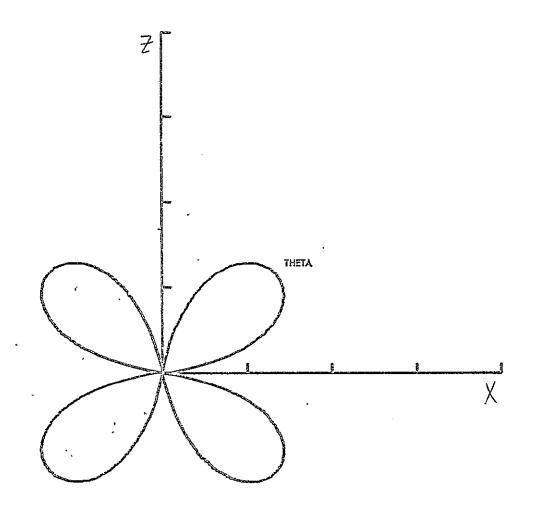
MODE BALANCED

DB MAX -0.5

DB MIN -20.5



FREQUENCY (MHZ) -900 V-ANT. LENGTH (FT) 759 -MODE BALANCED DB MAX -0.5 DB MIN -20.5



FREQUENCY (MHZ) .900 V-ANT. LENGTH (FT) 950 MODE UNBALANCED DB MAX - 0.5 DB MIN - 20.5

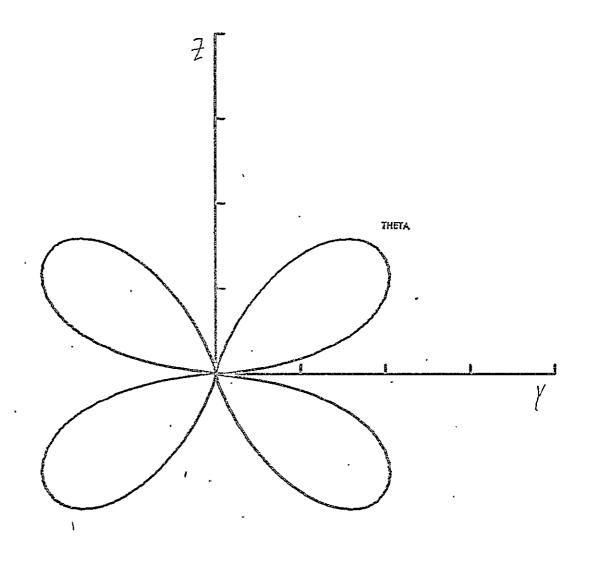


FIGURE 13-39

FREQUENCY (MHZ) .900

V-ANT. LENGTH (FT) 750

MODE UNBALANCED

DB MAX -0.5

DB MIN -20.5

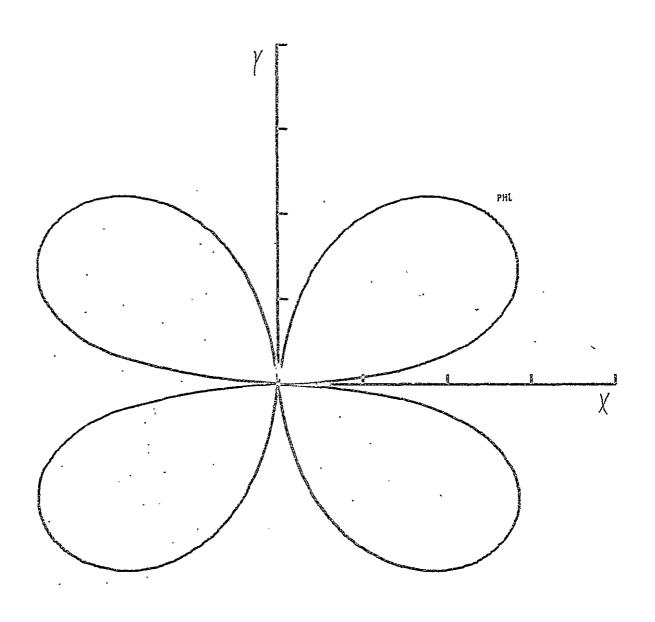


FIGURE B-40

FREQUENCY (MHZ) .900

V-ANT. LENGTH (FT) 752

MODE UNBALANCED

DB MAX - -0.5

DB MIN -20.5

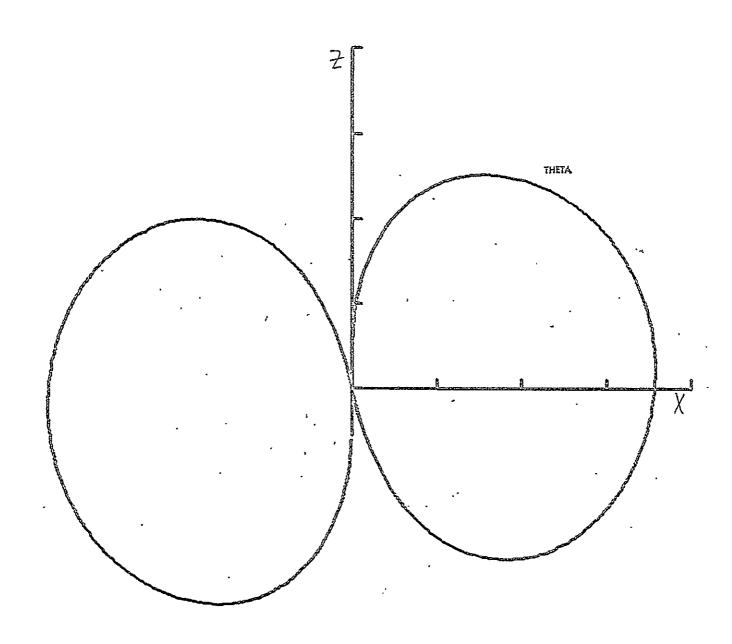


FIGURE 73-41

FREQUENCY (MHZ) .995

V-ANT. LENGTH (FT) 750

MODE BALANCED

DB, MAX +0.3

DB MIN -19.7

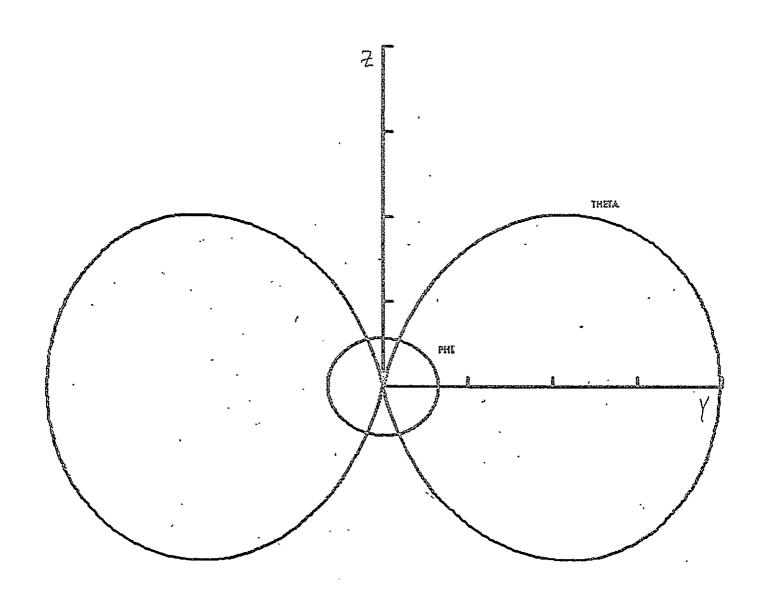


FIGURE 13 - 4 Z

FREQUENCY (MHZ) .995
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX + 0.3
DB MIN - 19.7

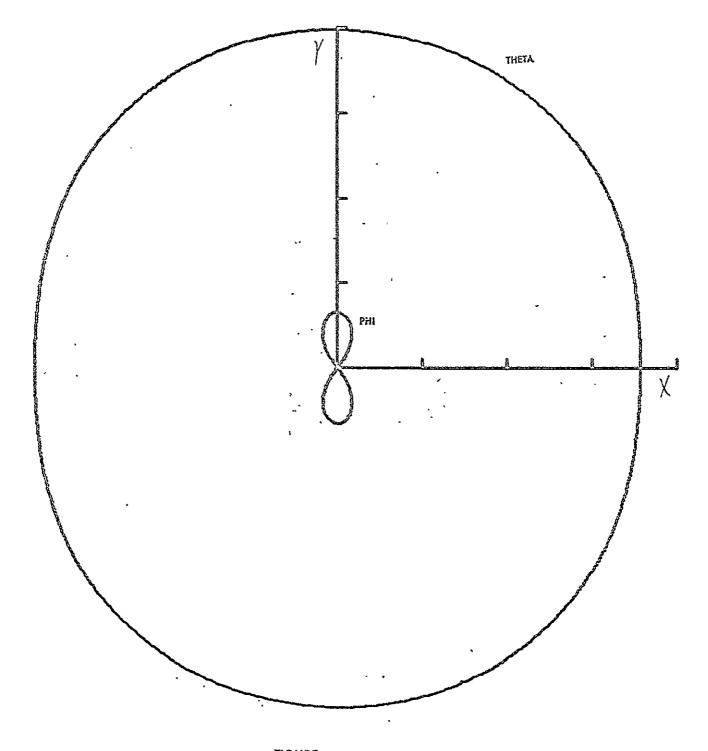


FIGURE B-43
FREQUENCY (MHZ) .995
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX +0.3
DB MIN -19.7

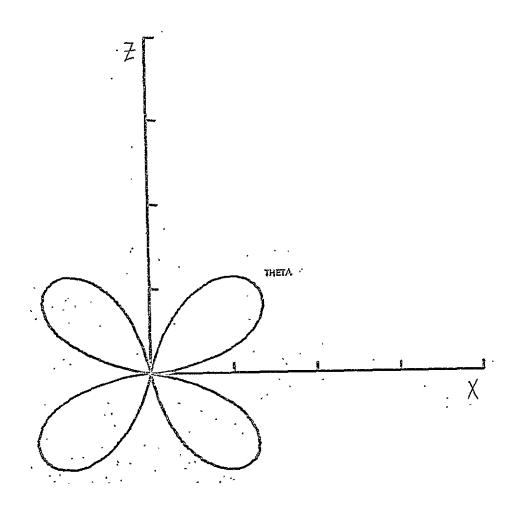


FIGURE B-44

FREQUENCY (MHZ) .995.

V-ANT. LENGTH (FT) 750

MODE UNBALANCED

DB MAX +0.3

DB MIN -19.7

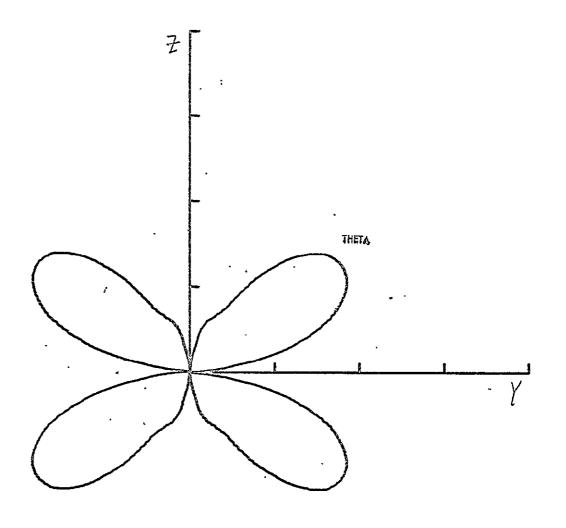


FIGURE 13 - 45
FREQUENCY (MHZ) .995
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX + 0.3
DB MIN - 19.7

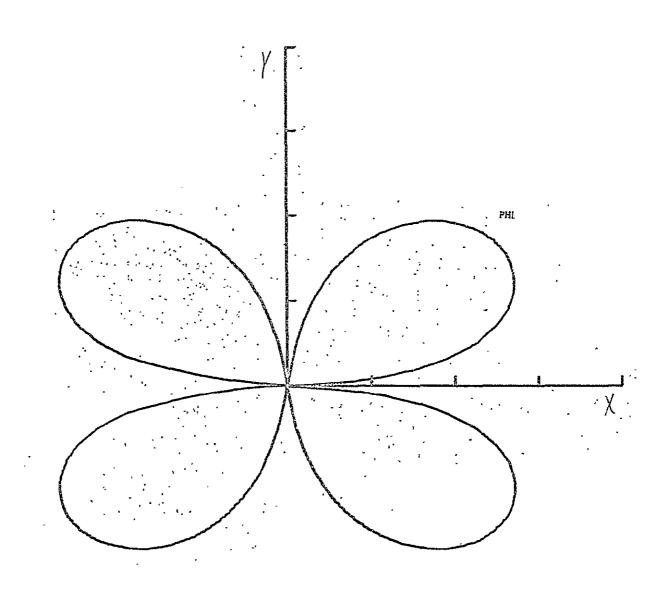


FIGURE 13-46

FREQUENCY (MHZ) .995

V-ANT. LENGTH (FT) 750

MODE UNBALANCED

DB MAX + 0.3

DB MIN - 19.7

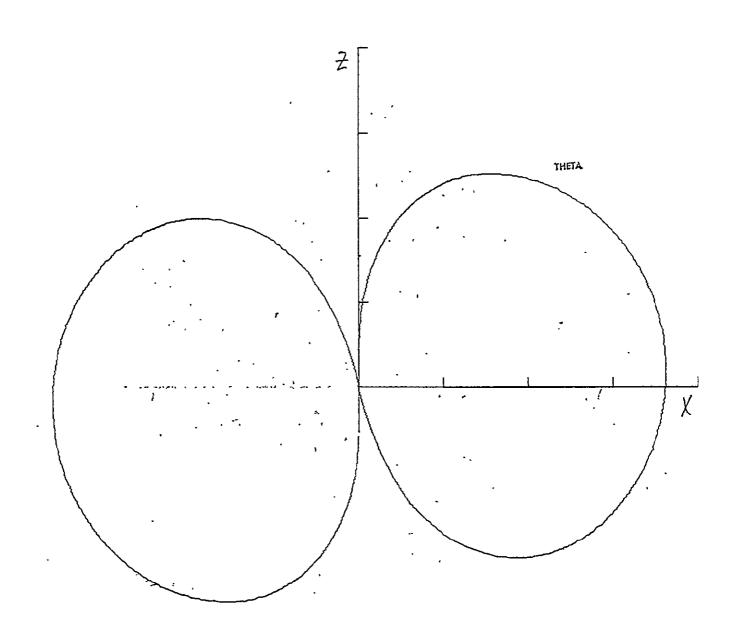


FIGURE B-47

FREQUENCY (MHZ) 1.107

V-ANT. LENGTH (FT) 750

MODE BALANCED

DB MAX +0.5

DB MIN -19.5

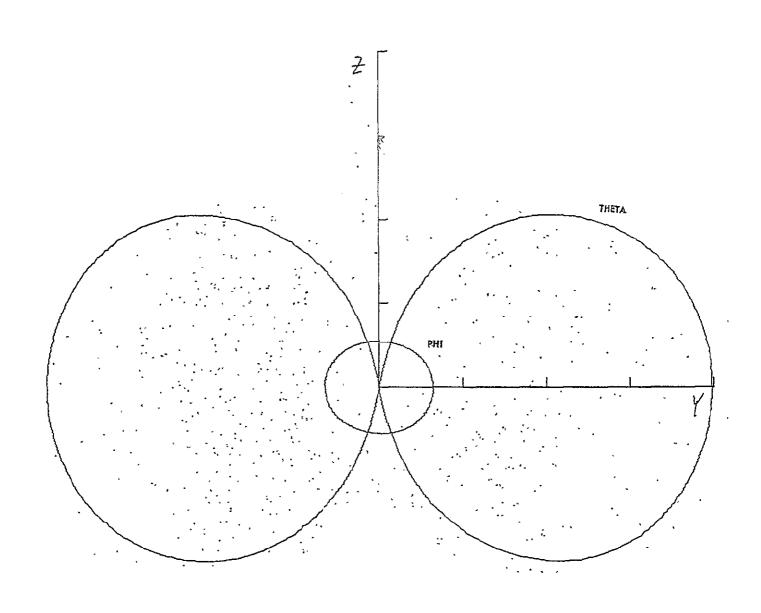


FIGURE B-48
FREQUENCY (MHZ) 1.107
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX +0.5
DB MIN -19.5

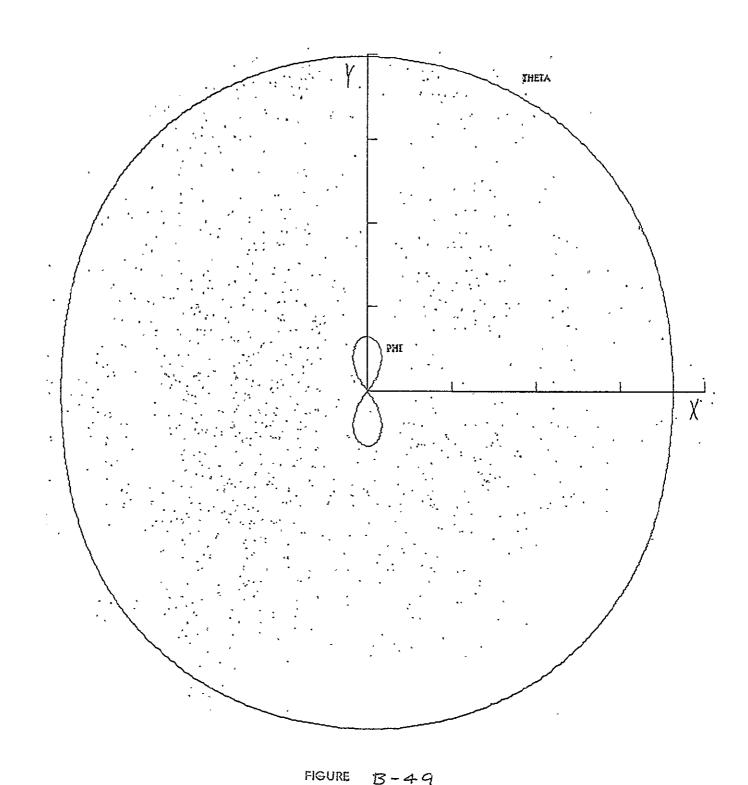


FIGURE B-49
FREQUENCY (MHZ) 1.107
Y-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX +0.5
DB MIN -19.5

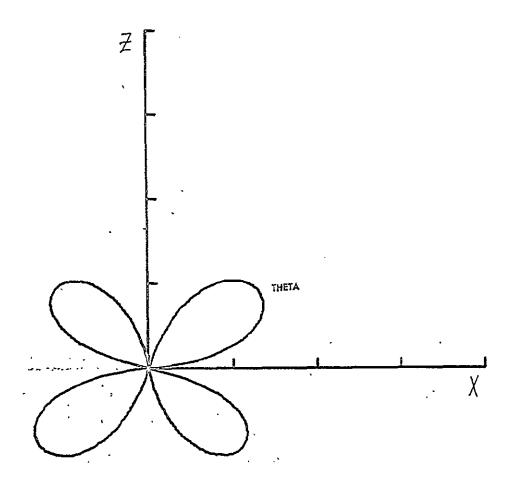


FIGURE 13-50

FREQUENCY (MHZ) 1.107

V-ANT. LENGTH (FT) . 750

MODE UNBALANCED

DB MAX + 0.5

DB MIN - 19.5

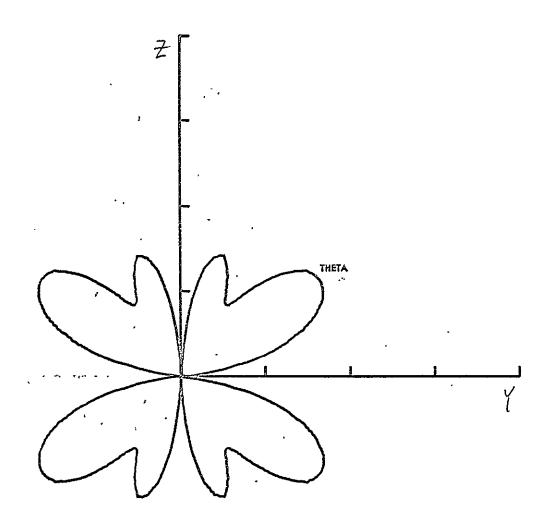


FIGURE 13-51
FREQUENCY (MHZ) 1.107
V-ANT. LENGTH (FT)
MODE UNBALANCED
DB MAX + 0.5
DB MIN - 19.5

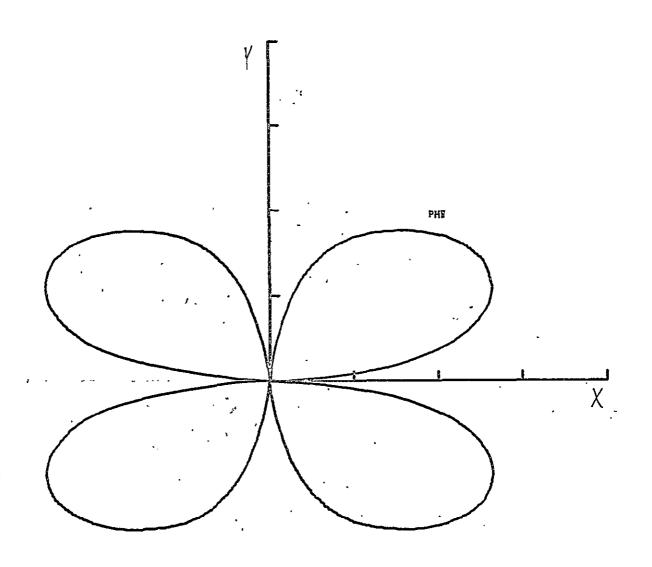


FIGURE B-52

FREQUENCY (MHZ) 1.107

V-ANT. LENGTH (FT) 750

MODE UNBALANCED

DB MAX + 0.5

DB MIN - 19.5

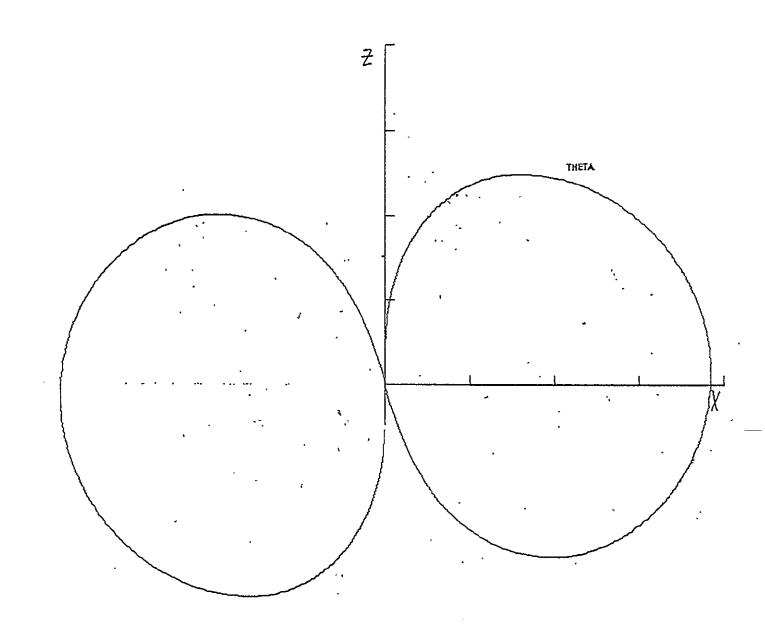
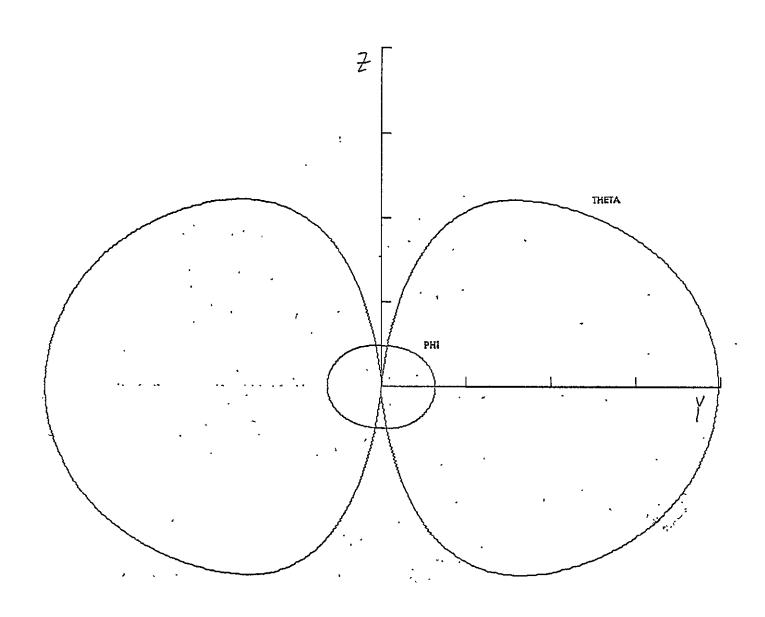


FIGURE B-53
FREQUENCY (MHZ) 1.31
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX + 0.7
DB MIN -19.3



FREQUENCY (MHZ) 1.31 V-ANT. LENGTH (FT) 750 MODE: BALANCED DB MAX +0.7 DB MIN -19.3

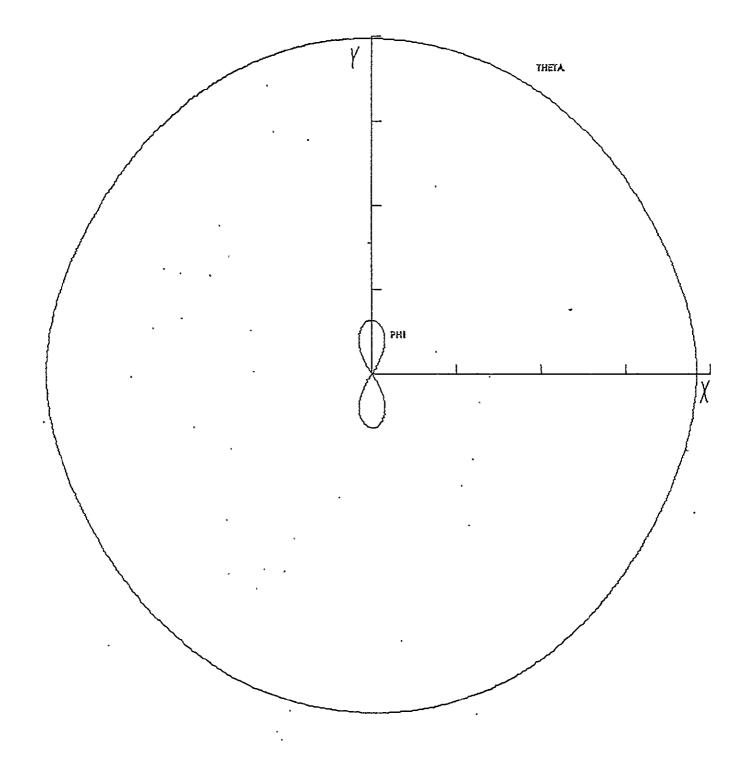


FIGURE B-55
FREQUENCY (MHZ) 1.31
Y-ANT. LENGTH (FT) 759
MODE BALANCED
DB MAX + 0.7
DB MIN - 19.3

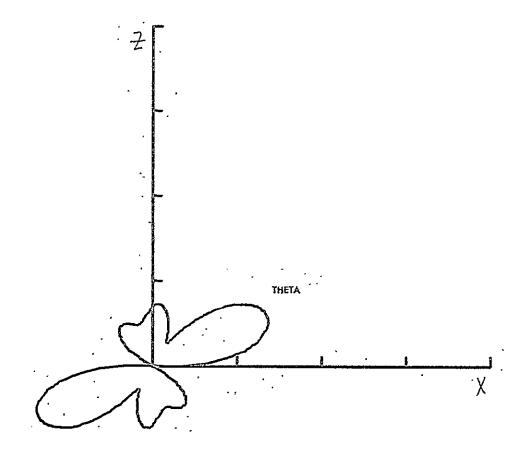


FIGURE 13-56

FREQUENCY (MHZ) 1.31

V-ANT. LENGTH (FT) 750

MODE UNBALANCED

DB MAX + 0.7

DB MIN - 19.3

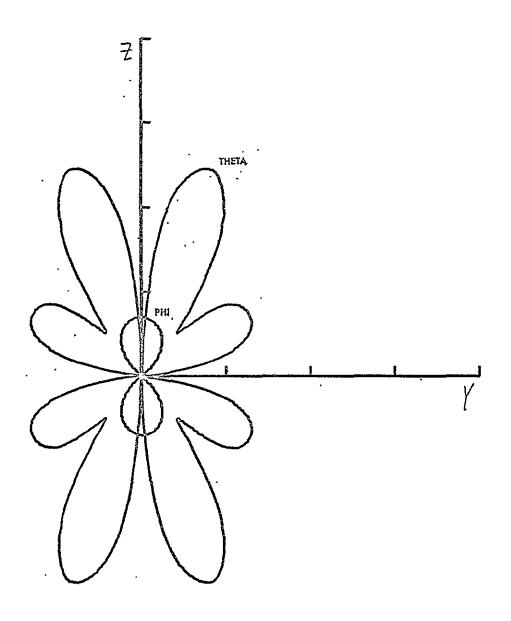


FIGURE 13-57

FREQUENCY (MHZ) 1.31

V-ANT. LENGTH (FT) 750

MODE UNBALANCED

DB MAX + 0.7

DB MIN - 19.3

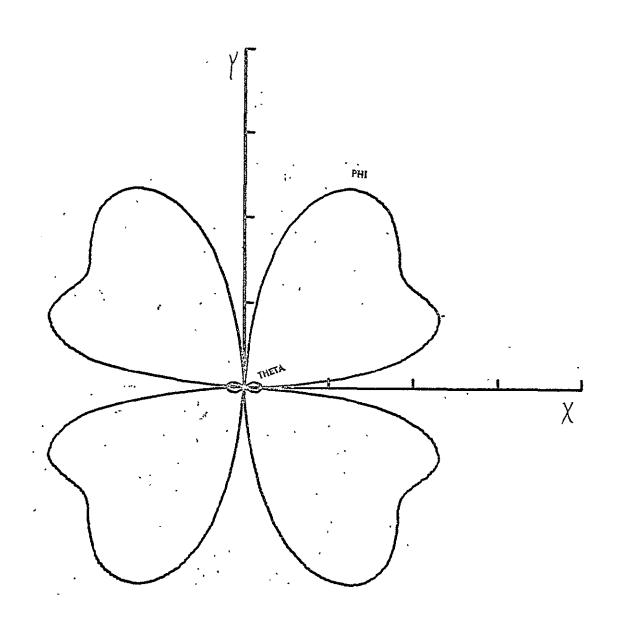


FIGURE 13-58

FREQUENCY (MHZ) 1.31

V-ANT. LENGTH (FT) 750

MODE UNBALANCED

DB MAX + 0.7

DB MIN - 19.3

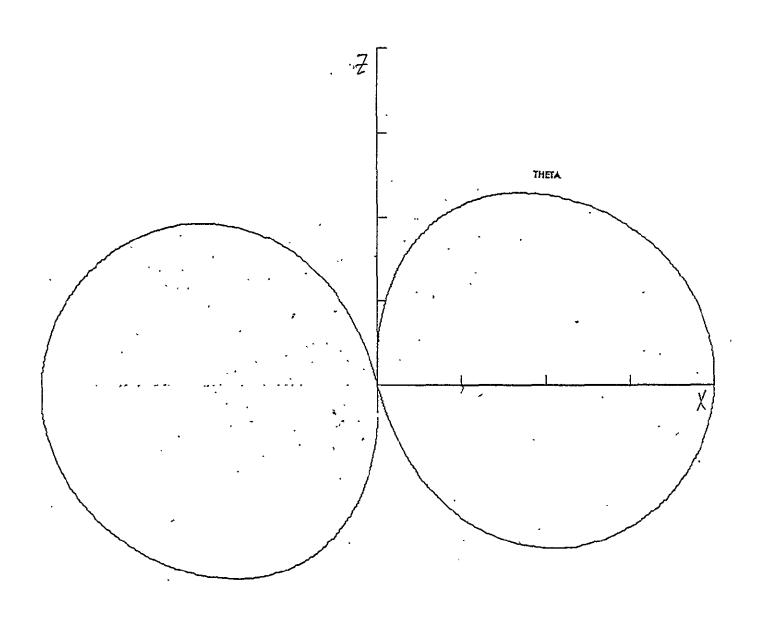
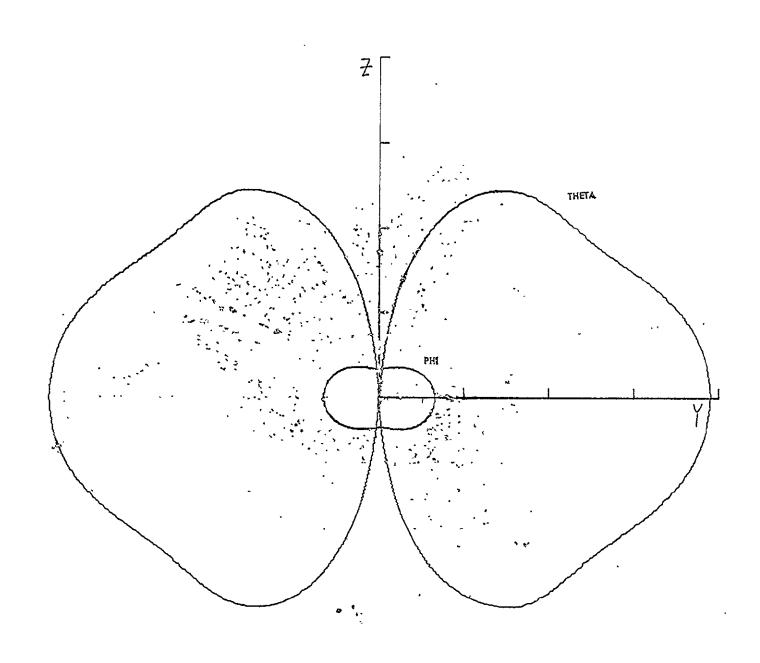


FIGURE 3-59
FREQUENCY (MHZ) 1.65
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX + 1.3
DB MIN - 18.7



EQUENCY (MHZ) 1.65 V-ANT. LENGTH (FT) 750 MODE BALANCED DB MAX +1.3 DB MIN -18.7

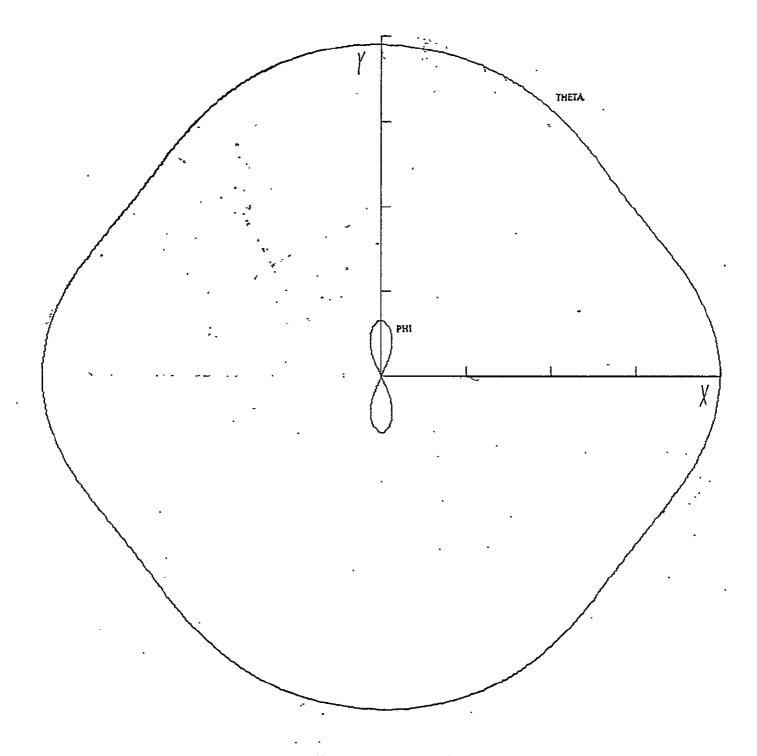


FIGURE 3-61
FREQUENCY (MHZ) 1.65
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX + 1.3
DB MIN - 18.7

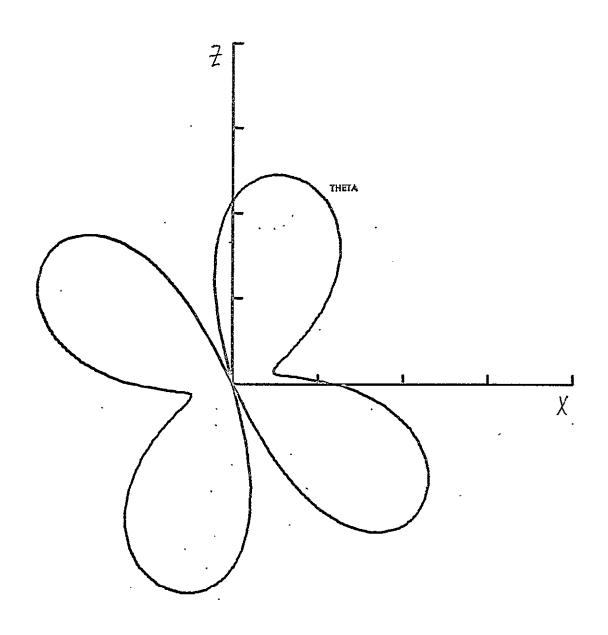


FIGURE B-62
FREQUENCY (MHZ) 1.65
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX + 1.3
DB MIN - 18.7

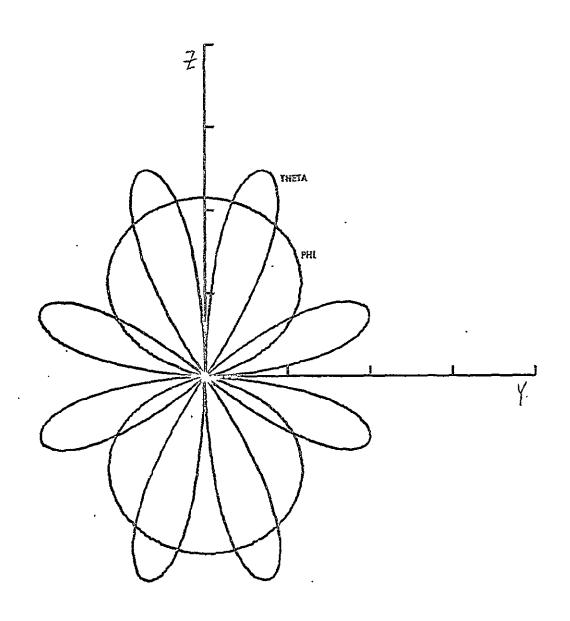


FIGURE 13-63.

FREQUENCY (MHZ) 1.65
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX +1.3
DB MIN -18.7

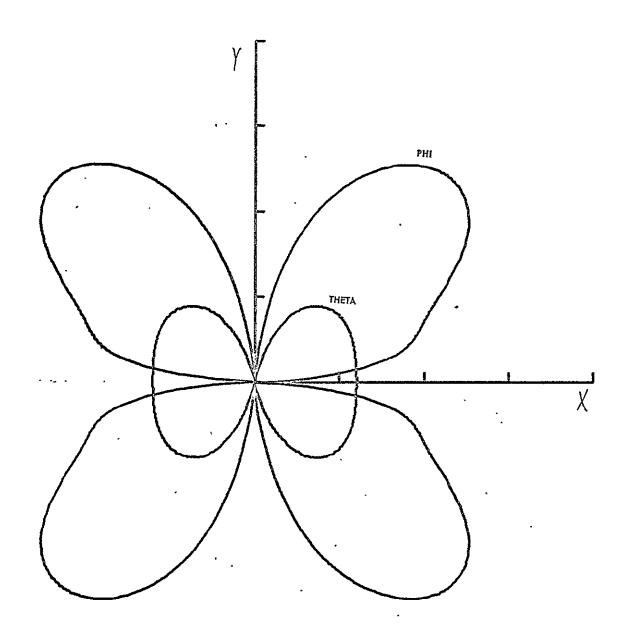


FIGURE B-64
FREQUENCY (MHZ) 1.65
V-ANT. LENGTH (FT) y50
MODE UNBALANCED
DB MAX + 1.3
DB MIN - 18.7

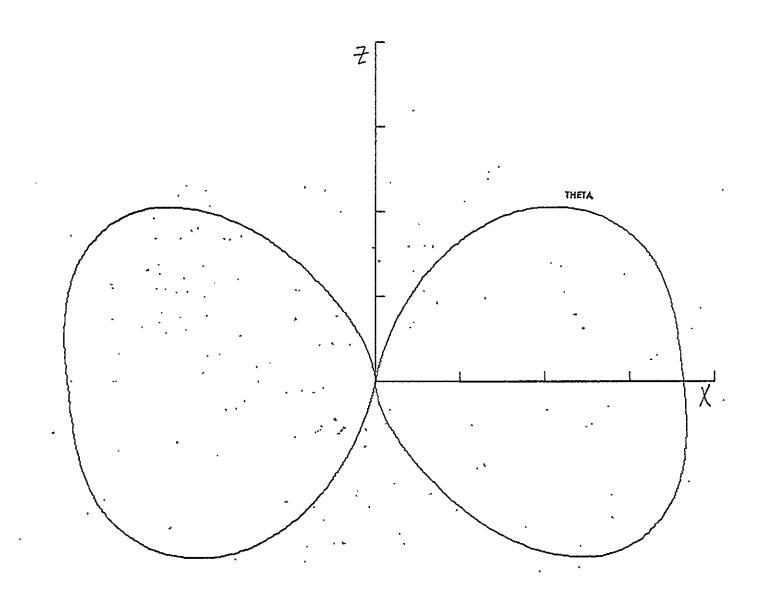


FIGURE B-65

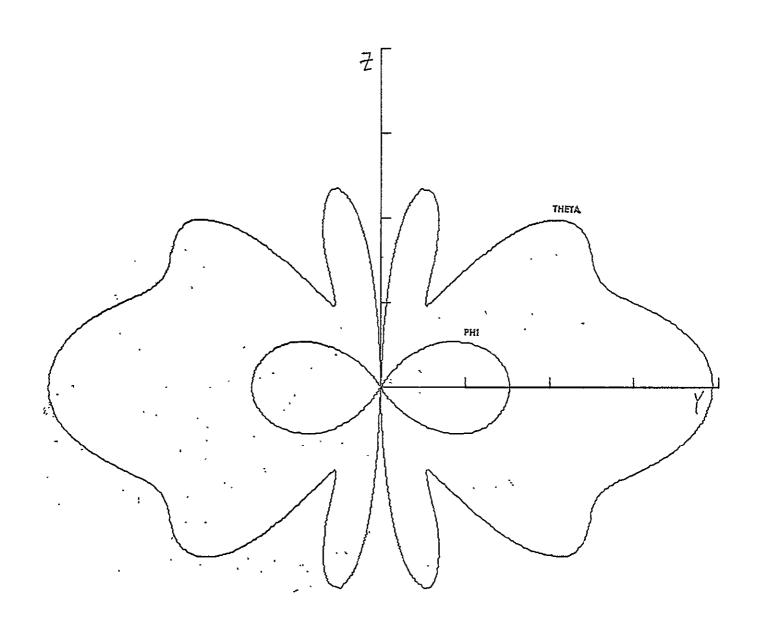
FREQUENCY (MHZ) 2.20

V-ANT. LENGTH (FT) 250

MODE BALANCED

DB MAX + 3.3

DB MIN - 16.7



HOURE B-66

LEQUENCY (MHZ) 2.20

-ANT. LENGTH (FT) 950

MODE BALANCED

DB MAX + 3.3

DB MIN -16.7

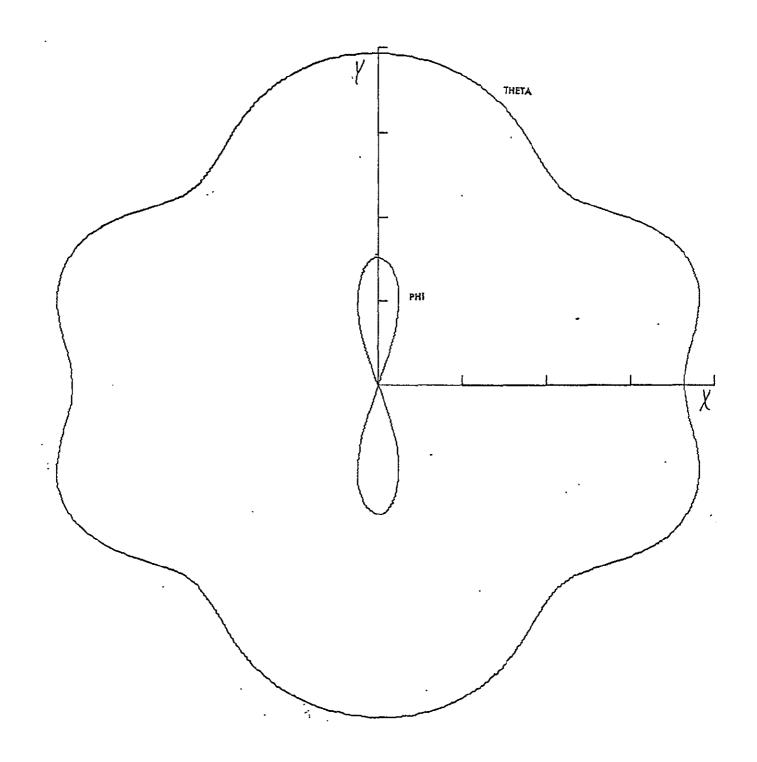


FIGURE B-67
FREQUENCY (MHZ) 2.20
V-ANT. LENGTH (FT) 150
MODE BALANCED
DB MAX + 3.3
DB MIN -16.7

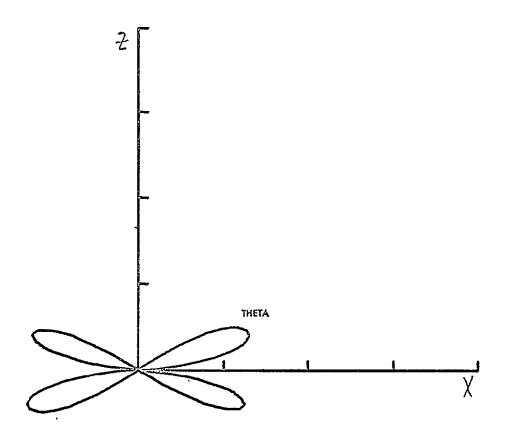


FIGURE 3-68

FREQUENCY (MHZ) 2.20

V-ANT. LENGTH (FT) 750

MODE UNBALANCED

DB MAX + 3.3

DB MIN - 16.7

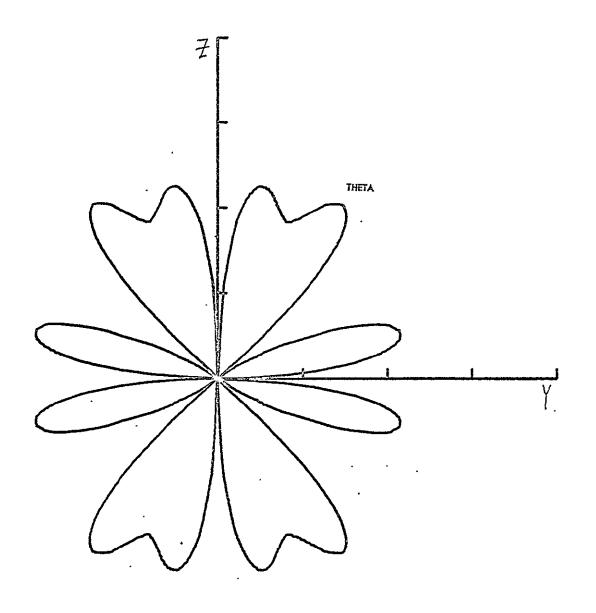


FIGURE 13-69.

FREQUENCY (MHZ) 2.20

V-ANT. LENGTH (FT) 750

MODE UNBALANCED

DB MAX + 3.3

DB MIN - 16.7

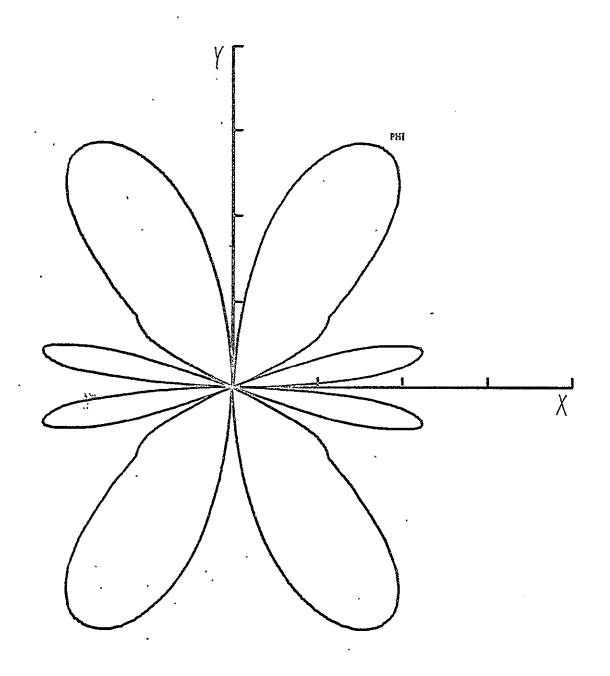


FIGURE 3-70

FREQUENCY (MHZ) 2.20

V-ANT. LENGTH (FT) 750

MODE UNBALANCED

DB MAX + 3.3

DB MIN - 16.7

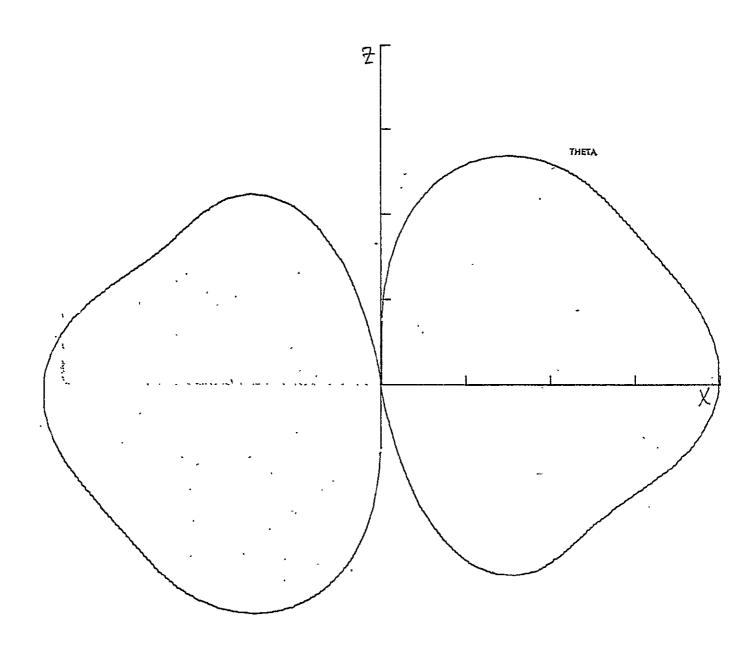


FIGURE 13-7/
FREQUENCY (MHZ) 2.80
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX + 2.8
DB MIN - 17.2

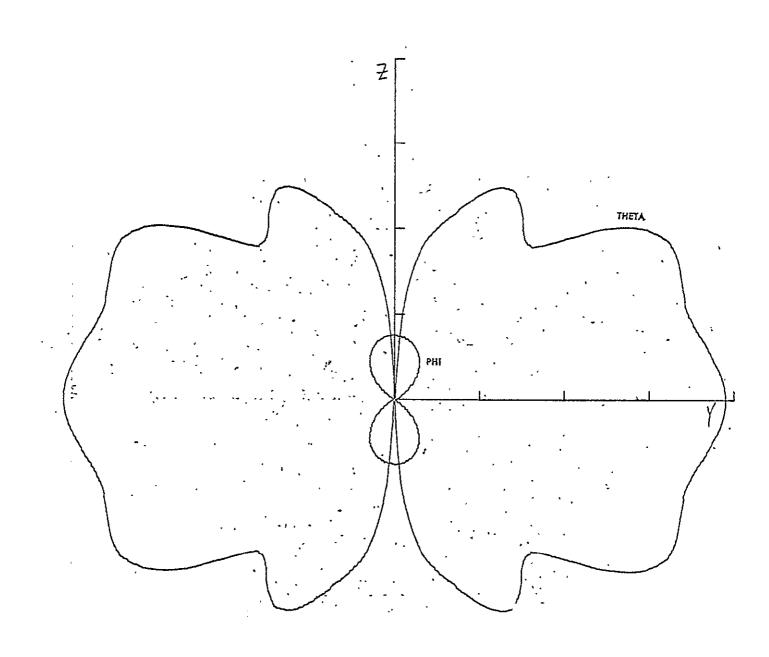


FIGURE B-72

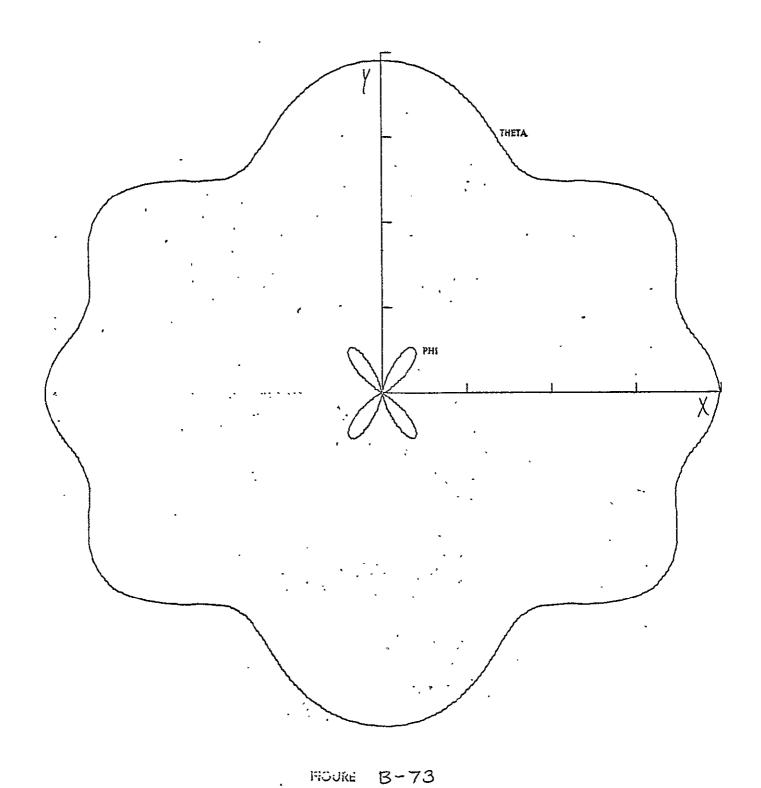
FREQUENCY (MHZ) 2.80

V-ANT. LENGTH (FT) \$50

MODE BALANCED

DB MAX + 2.8

DB MIN - 17.2



FREQUENCY (MHZ) 2.80
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX + 2.8
DB MIN - 17.2

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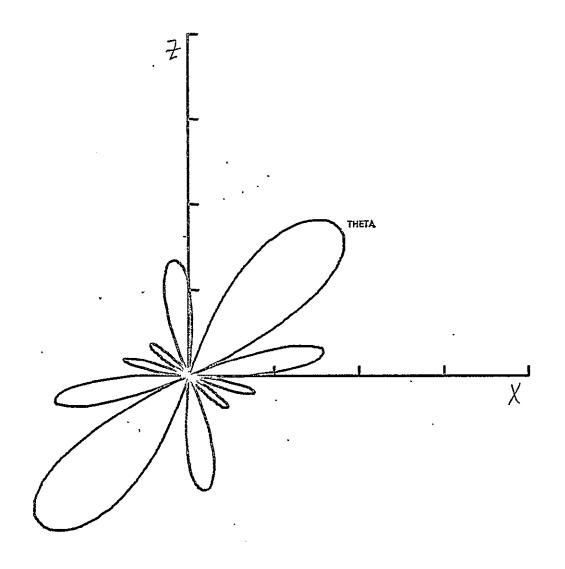


FIGURE B-74

FREQUENCY (MHZ) 2.80

V-ANT. LENGTH (FT) 750

MODE UNBALANCED

DB MAX +2.8

DB MIN -17.2

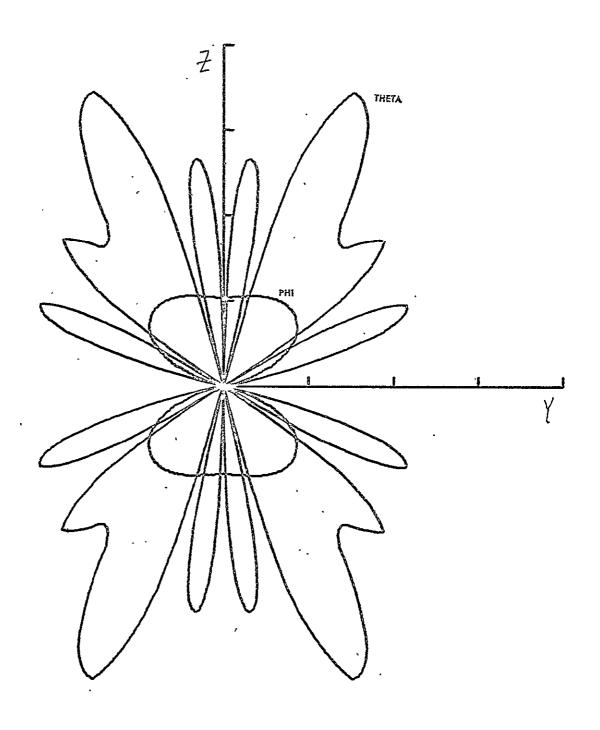


FIGURE B-75

FREQUENCY (MHZ) 2.80

V-ANT. LENGTH (FT) 750

MODE UNBALANCED
DB MAX + 2.8

DB MIN -17.2

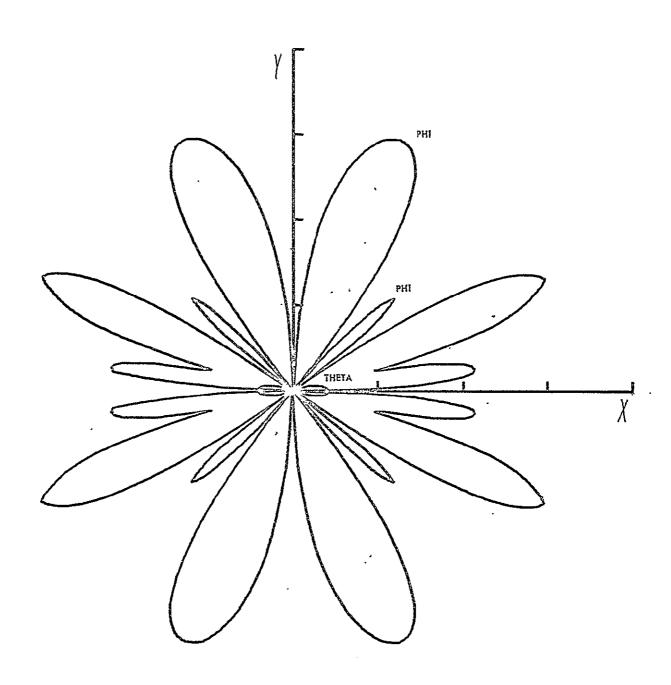


FIGURE 13-76

FREQUENCY (MHZ) 2.80

V-ANT. LENGTH (FT) 750

MODE UNBALANCED

DB MAX + 2.8

DB MIN -17.2

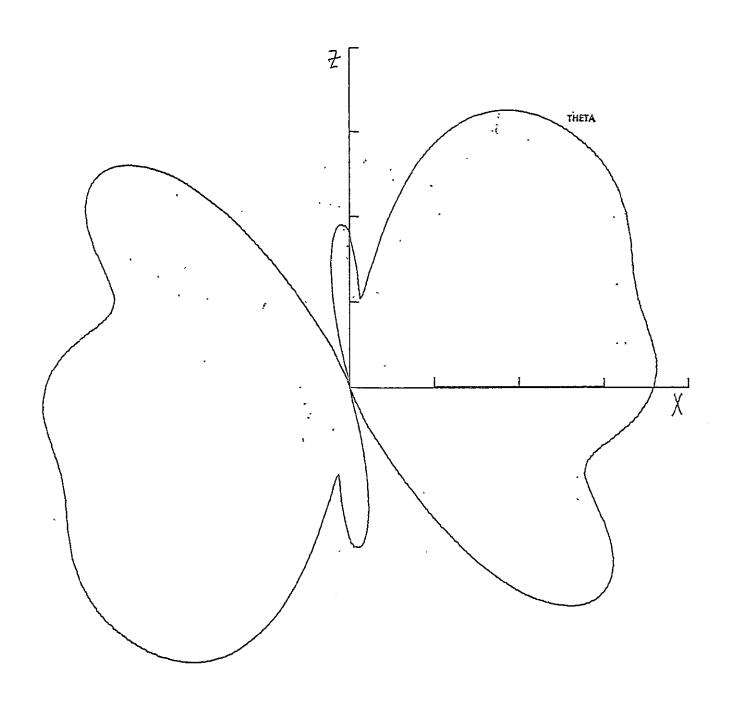


FIGURE B-77
FREQUENCY (MHZ) 3.93
Y-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX +1.7
DB MIN -18.3

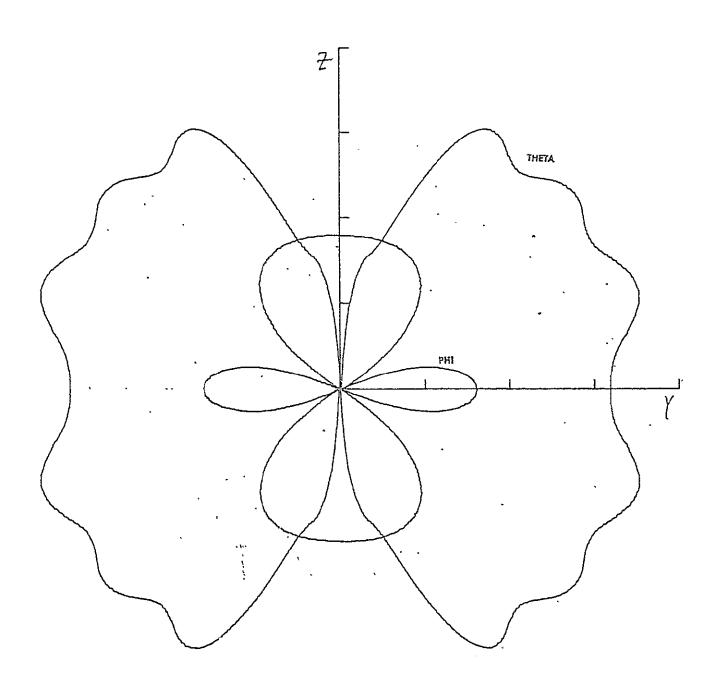


FIGURE B-78
FREQUENCY (MHZ) 3.93
V-ANT. LENGTH (FT) 950
MODE BALANCED
DB MAX + 1.7
DB MIN - 18.3

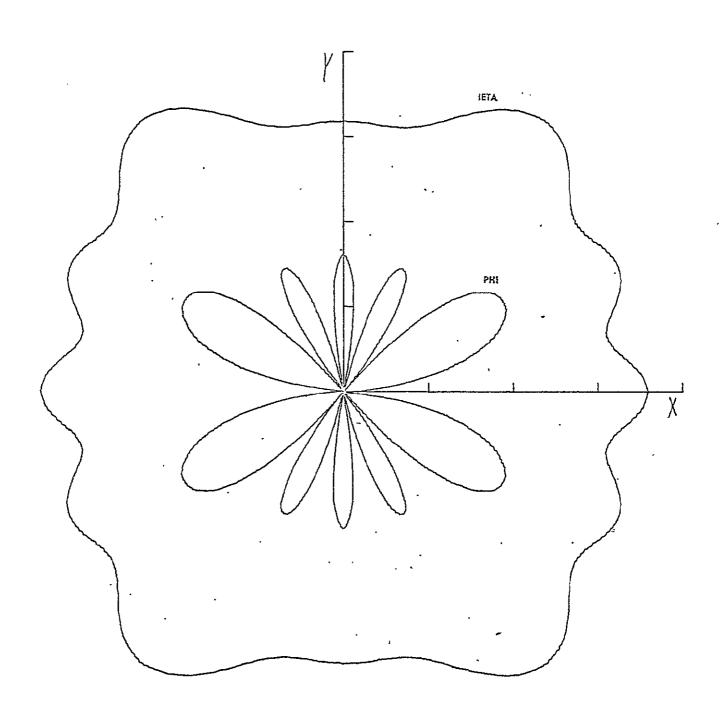
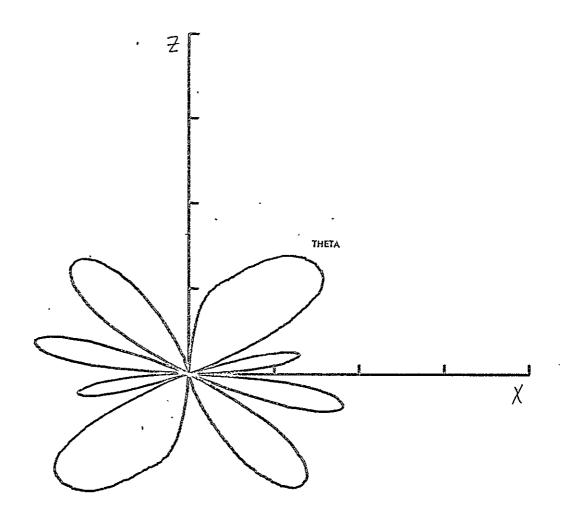


FIGURE 13-79
FREQUENCY (MHZ) 3.93
V-ANT. LENGTH (FT) 259
MODE BAIANCED
DB MAX +1.7
DB MIN -18.3



FREQUENCY (MHZ) 3.93 V-ANT. LENGTH (FT) y50 MODE UNBALANCED DB MAX +1.7 DB MIN -18.3

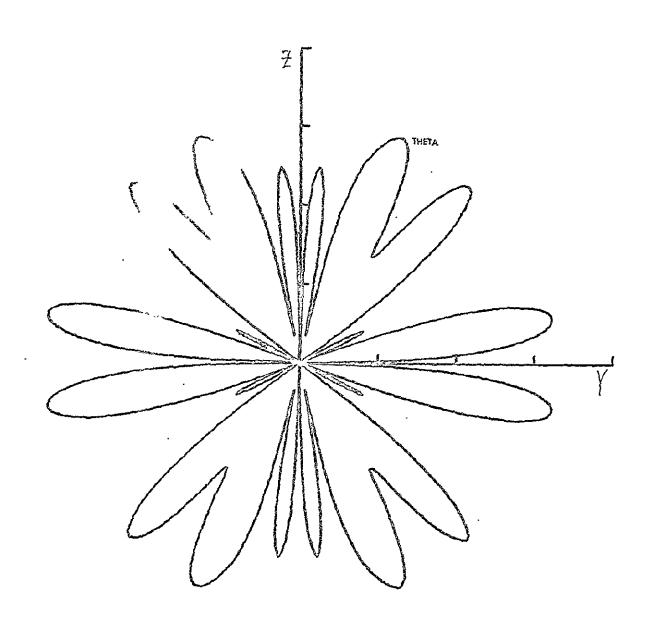


FIGURE 13-81

FREQUENCY (MHZ) 3,93

V-ANT. LENGTH (FT) 750

MODE UNBALANCED

DB MAX +1.7

DB MIN -18.3

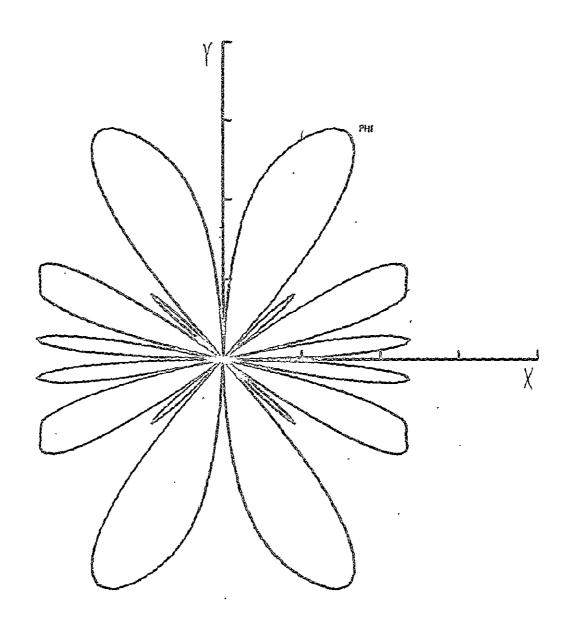


FIGURE 13-82

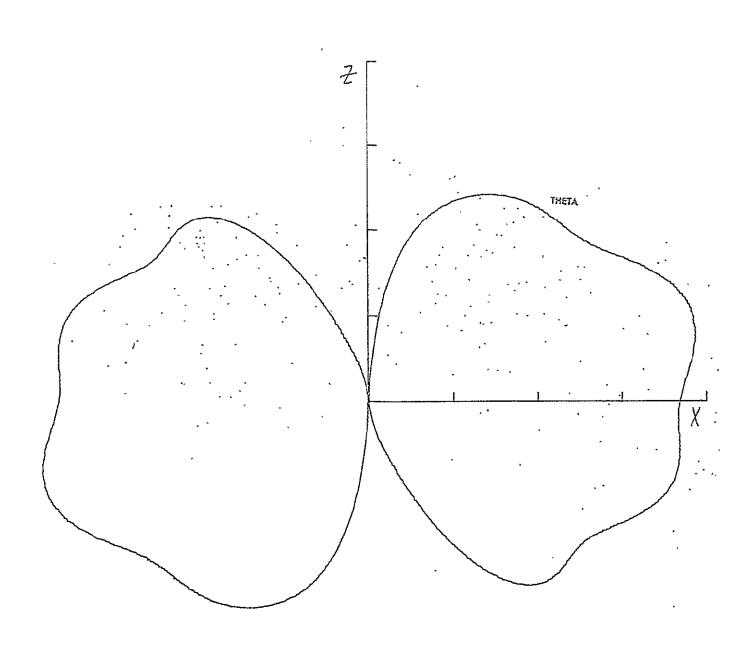
FREQUENCY (MHZ) 3.93

Y-ANT. LENGTH (FT) 750

MODE UNBALANCED

DB MAX + 1.7

DB MIN - 18.3



FREQUENCY (MHZ) 4.70 V-ANT. LENGTH (FT) \$50 MODE BALANCED DB MAX +2.9 DB MIN -17.1

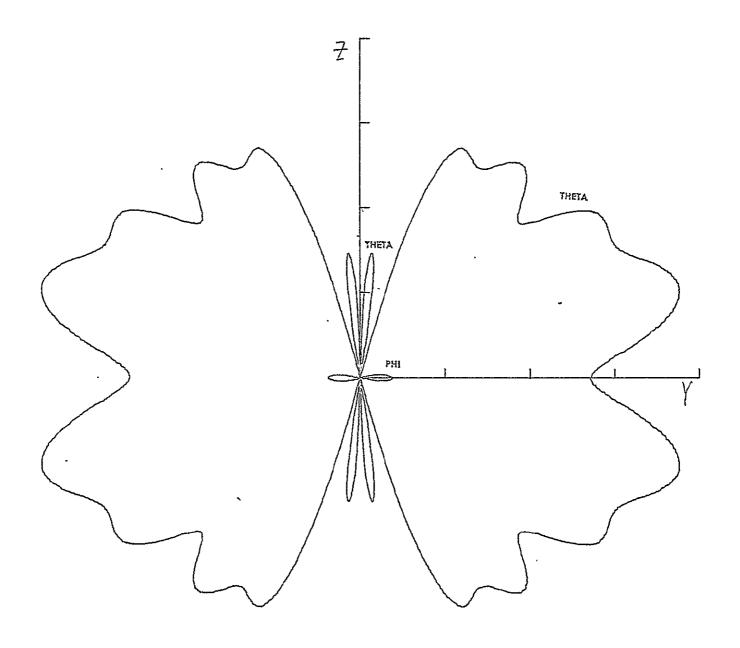


FIGURE 13-84

FREQUENCY (MHZ) 4.70

V-ANT. LENGTH (FT) 259

MODE BALANCED

DB MAX + 2.9

DB MIN - 17.1

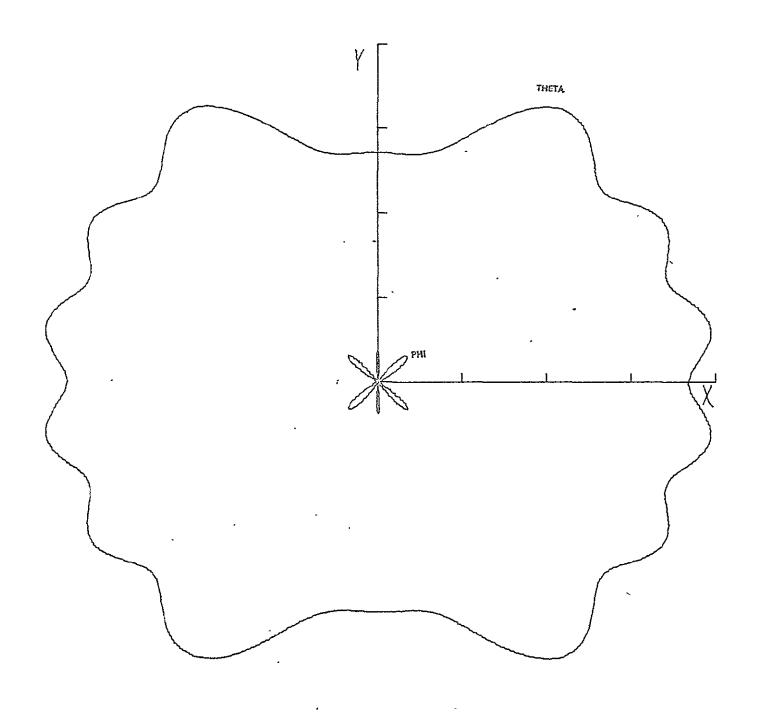


FIGURE B-85

FREQUENCY (MHZ) 4.70

V-ANT. LENGTH (FT) 259

MODE BALANCED
DS MAX + 2.9

DB MIN - 17.1

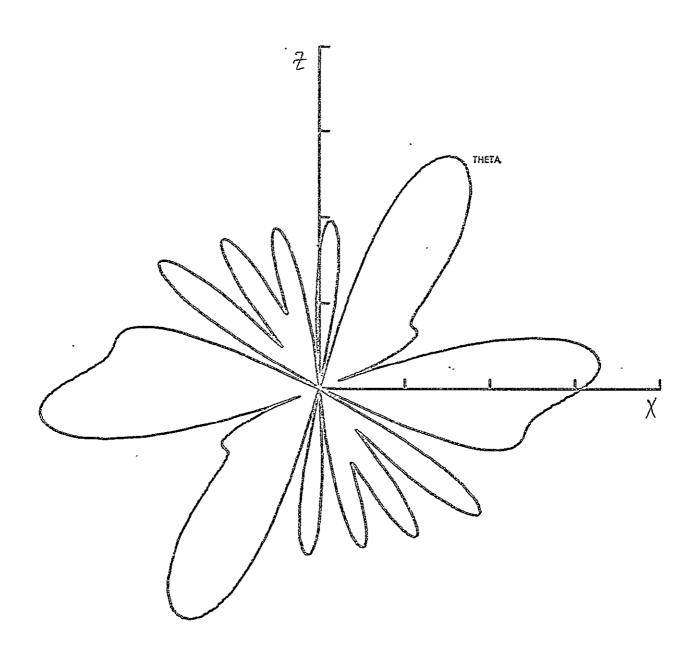


FIGURE B-86

FREQUENCY (MHZ) 4.70

V-ANT. LENGTH (FT) 750.

MODE UNBALANCED

DB. MAX. + 2.9

DS. MIN - 17.1

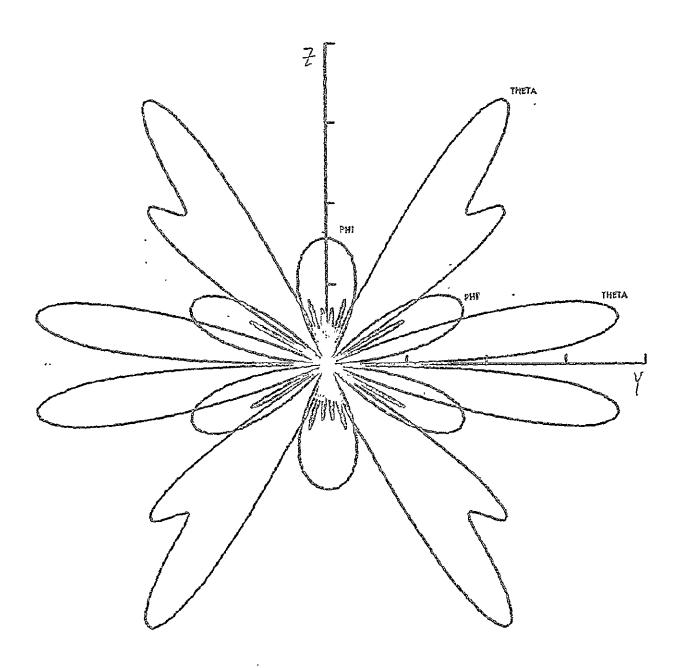


FIGURE B-87

FREQUENCY (MHZ) 4.70

V-ANT. LENGTH (FT) 950

MODE UNBALANCED

DB MAX +2.9

DB MIN -/7.1

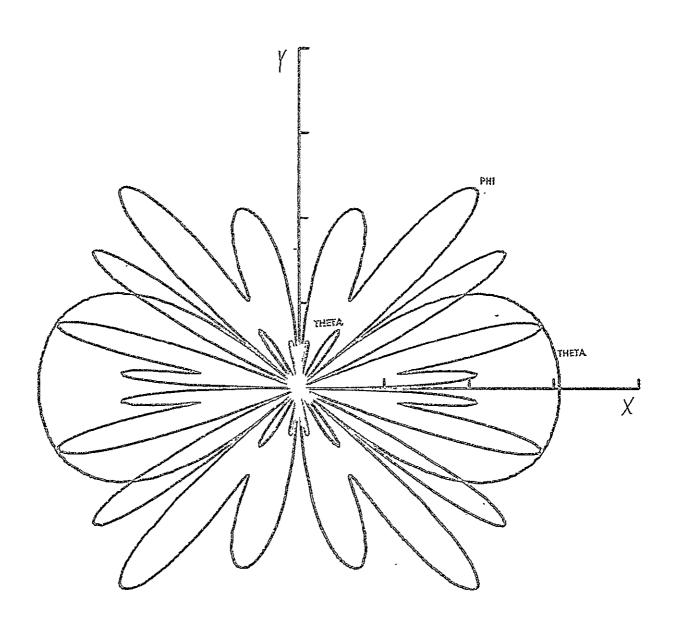


FIGURE B-88

FREQUENCY (MHZ) 4.70
V-ANT. LENGTH (FT) 750

MODE UNBALANCED
DB MAX +2.9
DB MIN -17.1

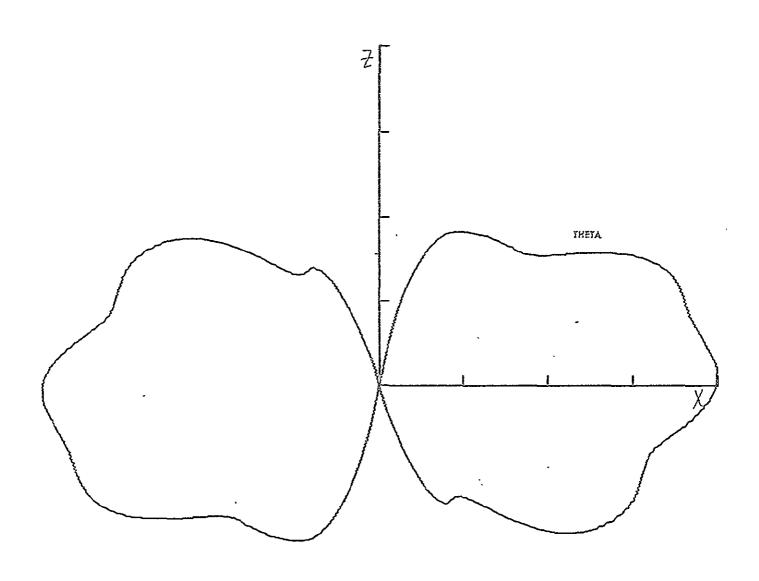


FIGURE B - 89
FREQUENCY (MHZ) 6.55
Y-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX + 3.3
DB MIN - 16.7

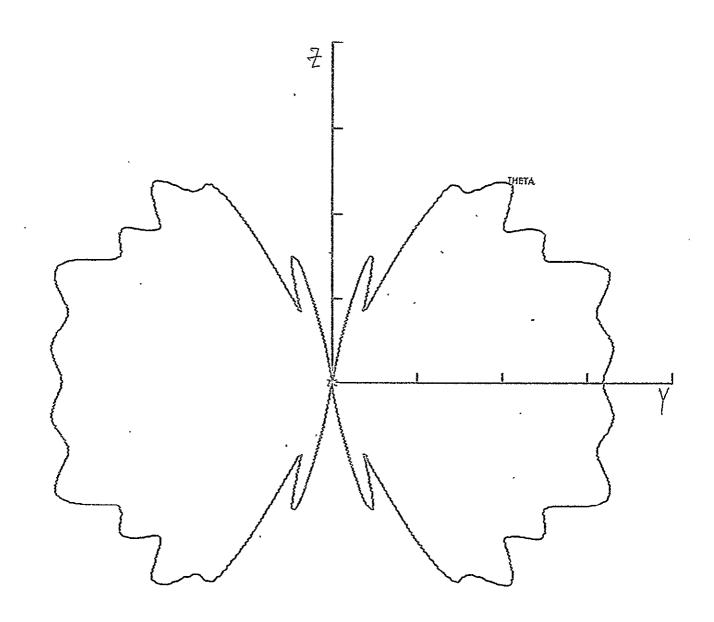


FIGURE B-90

FREQUENCY (MHZ), 6.55

V-ANT. LENGTH (FT) 750

MODE BALANCED

DB MAX + 3.3

DB MIN -16.7

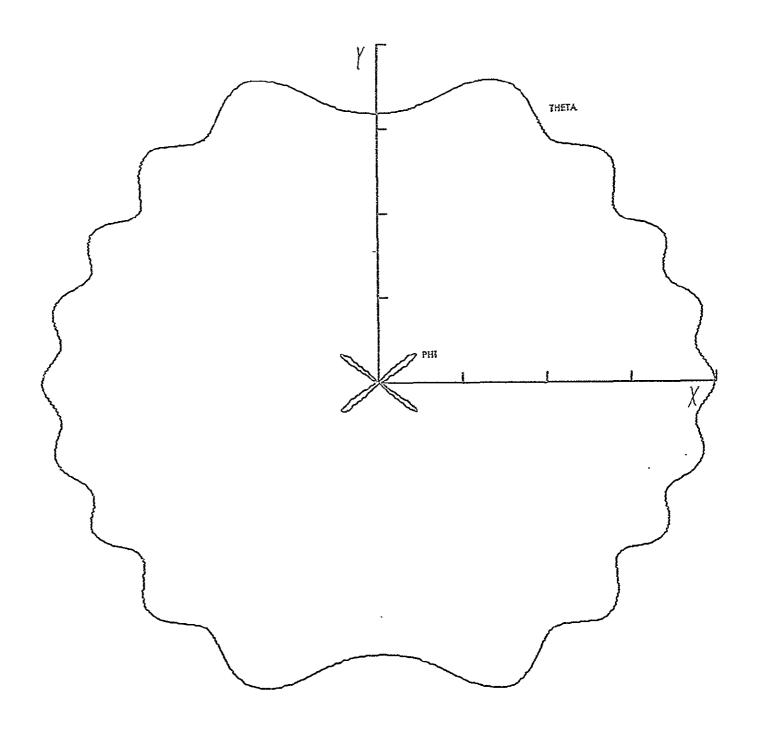


FIGURE B-91
FREQUENCY (MHZ) 6.55
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX + 3.3
DB MIN -16.7

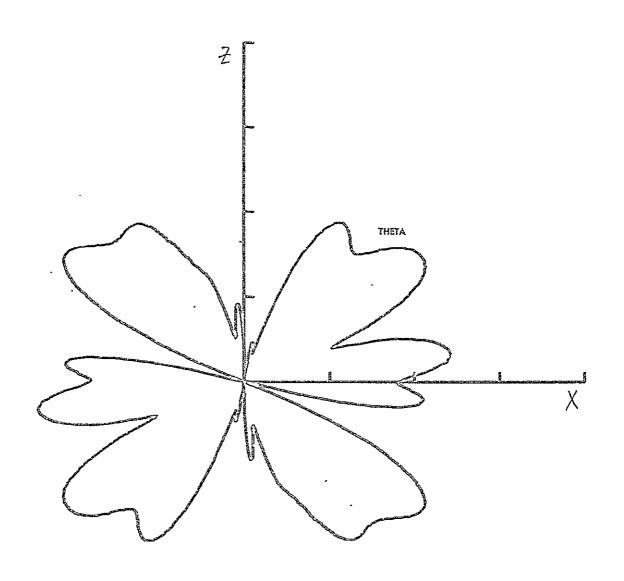
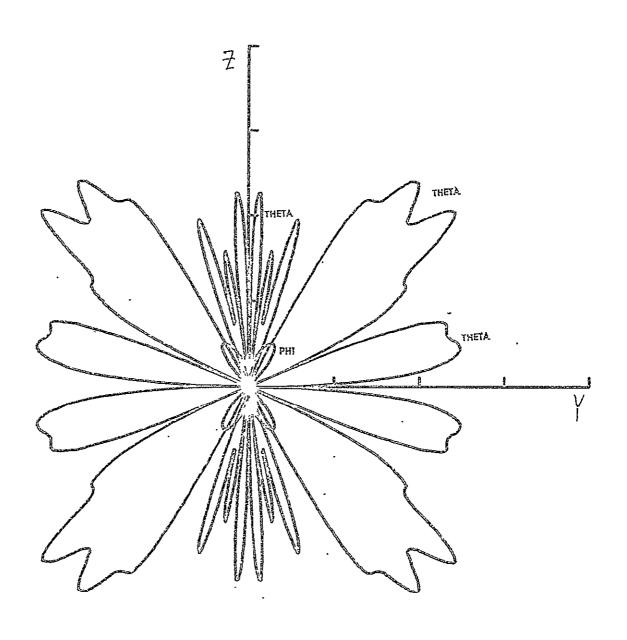


FIGURE B-92
FREQUENCY (MHZ) 6.55
V-ANT. LENGTH (FF) 750
MODE UNBALANCED
DB MAX + 3:3
DB MIN - 16:7



FREQUENCY (MHZ) 6.55 V-ANT. LENGTH (FT) 750 MODE UNBALANCED DB MAX + 3.3 DB MIN - 16.7

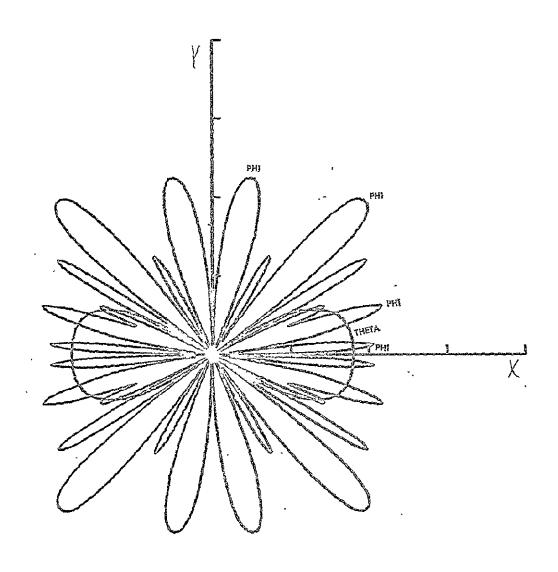


FIGURE B-94
FREQUENCY (MHZ) 6.55
V-ANT. LENGTH (FT) 759
MODE UNBALANCED
DB MAX + 3.3
DB MIN -16.7

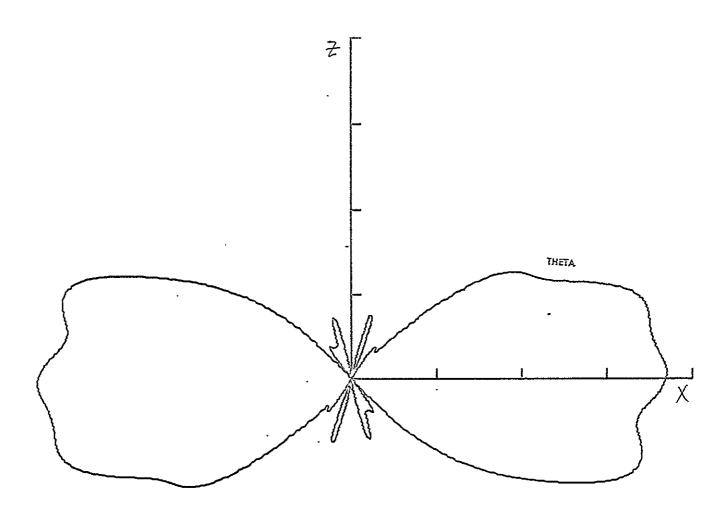


FIGURE B-95

FREQUENCY (MHZ) 9.18

V-ANT. LENGTH (FT) 750

MODE BALANCED

DB MAX + 4.9

DB MIN -15.1

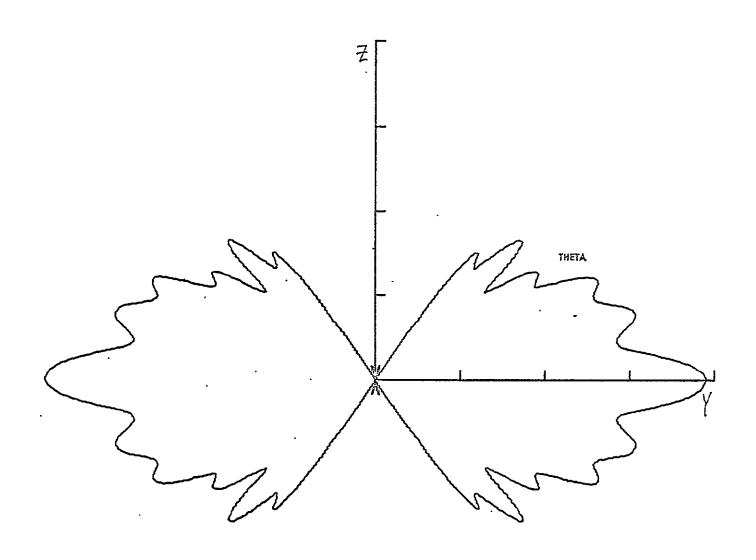


FIGURE B-96
FREQUENCY (MHZ) 9.18
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX + 4.9
DB MIN -15.1

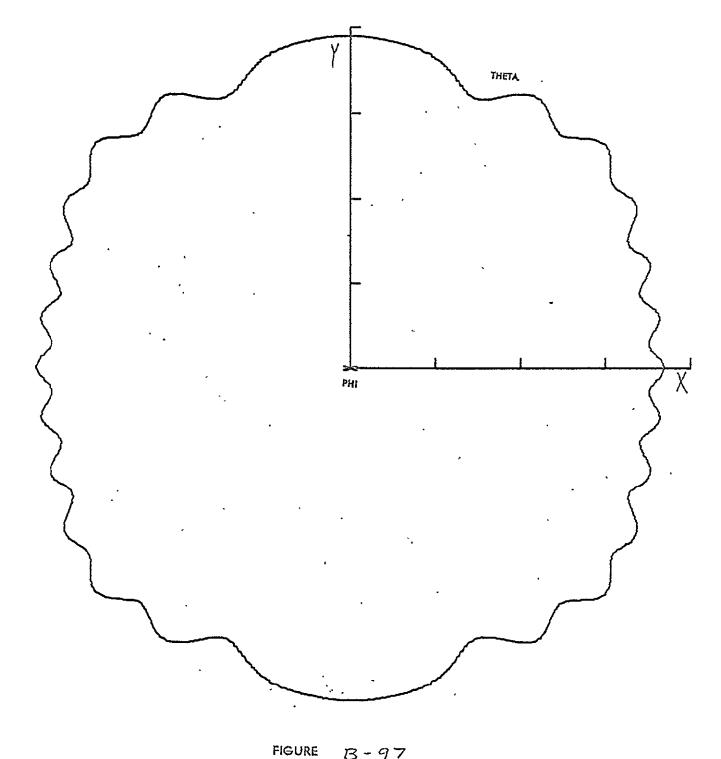


FIGURE B-97

FREQUENCY (MHZ) 9.18

V-ANT. LENGTH (FT) 750

MODE BALANCED

DB MAX + 4.9

DB MIN - 15.1

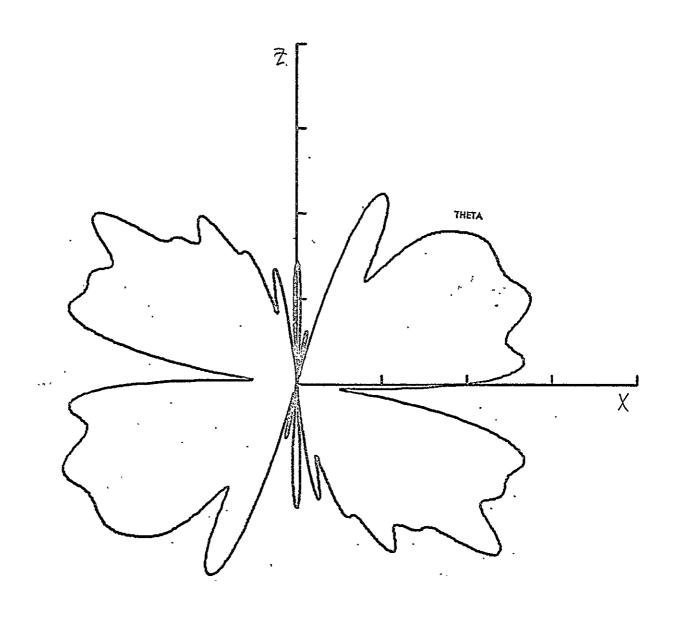


FIGURE B-98
FREQUENCY (MHZ) 9.18
V-ANT. LENGTH (FT) y50
MODE UNBALANCED
DB MAX + 4.9
DB MIN -15.1

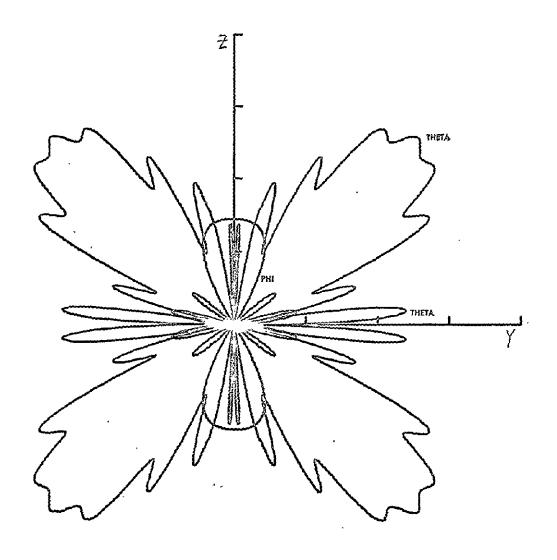


FIGURE 13-99
FREQUENCY [MHZ] 9.18
V-ANT. LENGTH [FT] 750
MODE UNBALANCED
DB MAX + 4.9
DB MIN - 15.1

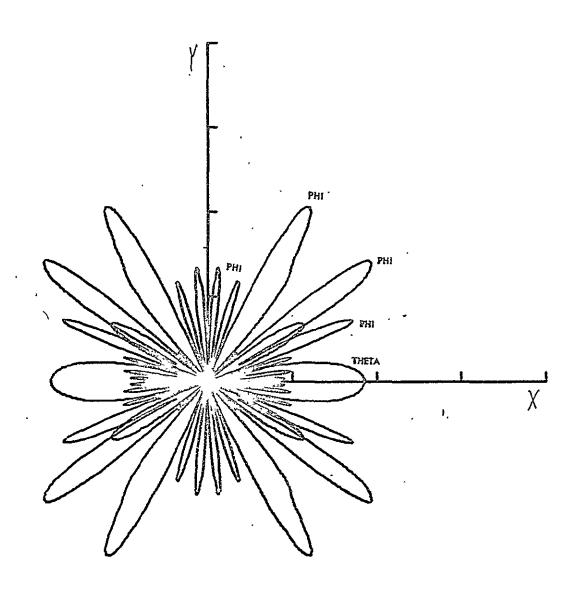


FIGURE 13-100
FREQUENCY (MHZ) 9.18
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX + 4.9
DB MIN - 15.1

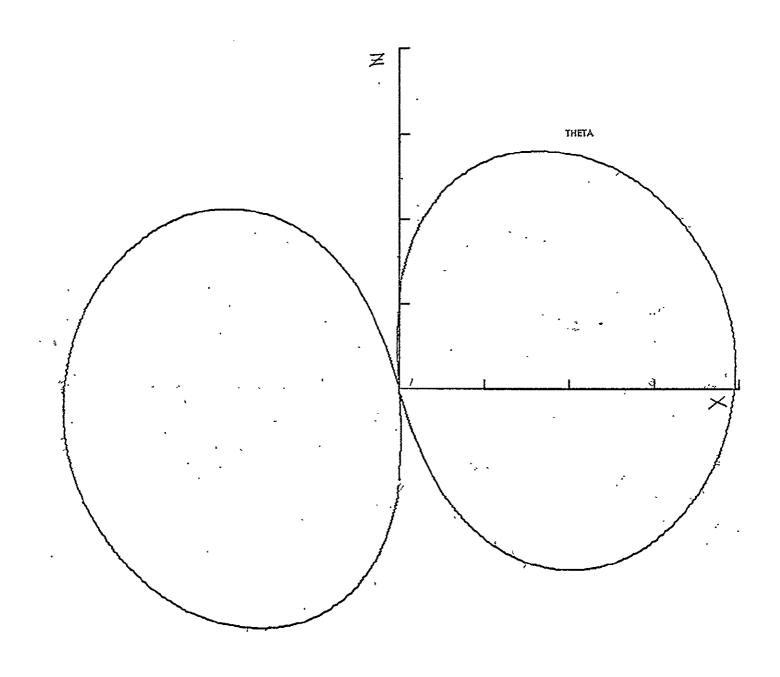


FIGURE B-101

FREQUENCY (MHZ) . 202

V-ANT. LENGTH (FT)

MODE BALANCED

DB MAX - 18.7

DB MIN - 38.7

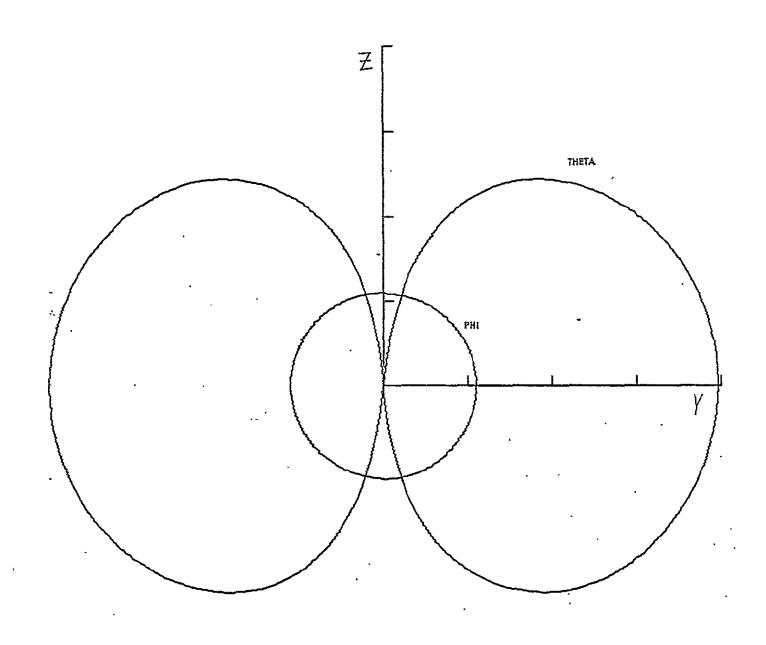


FIGURE B-102

FREQUENCY (MHZ) .202

V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX - 18.7

DB MIN - 38.7

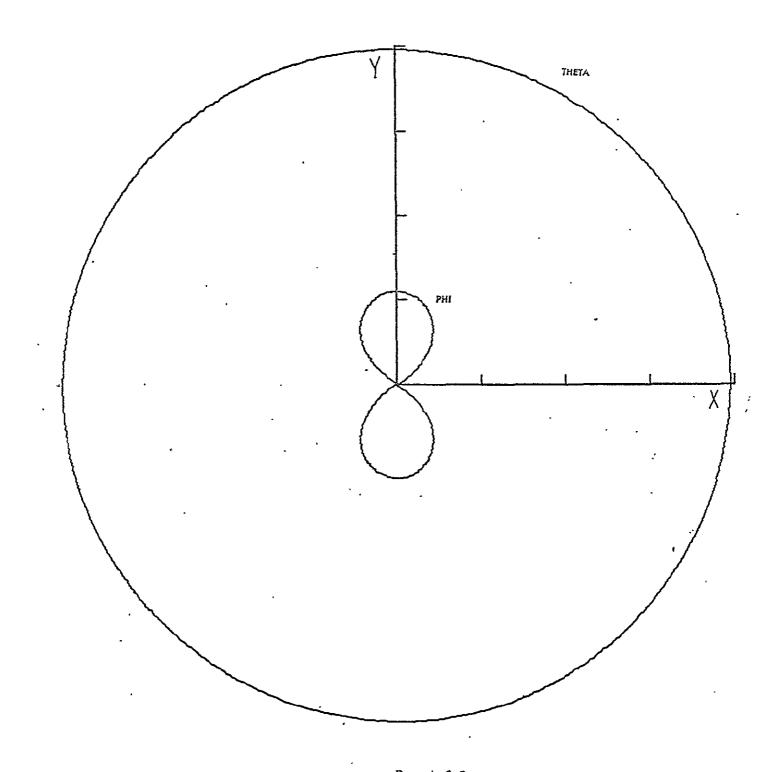


FIGURE B-103

FREQUENCY (MHZ) .202

V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX - 18.7

DB MIN -38.7

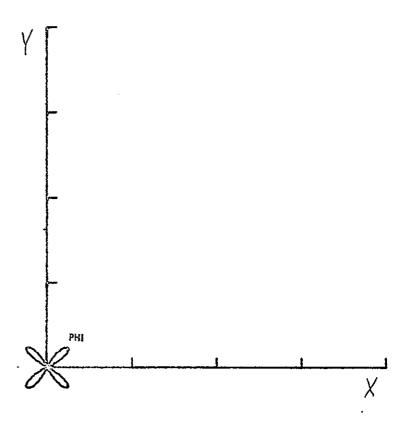


FIGURE B-104

FREQUENCY (MHZ) .202

V-ANT. LENGTH (FT) 450

MODE UNBALANCED

DB MAX - 18.7

DB MIN - 38.7

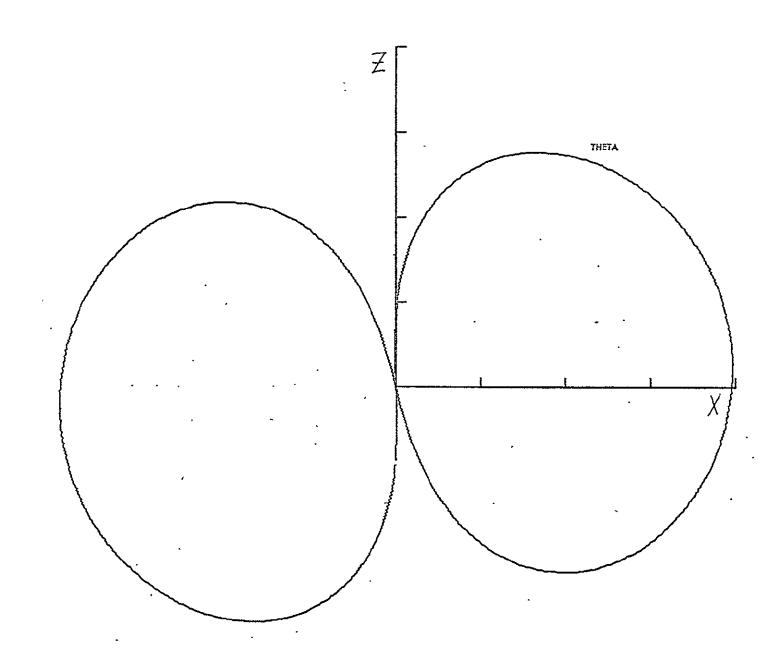


FIGURE B-105

FREQUENCY (MHZ) . 311

V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX -13.8

DB MIN -33.8

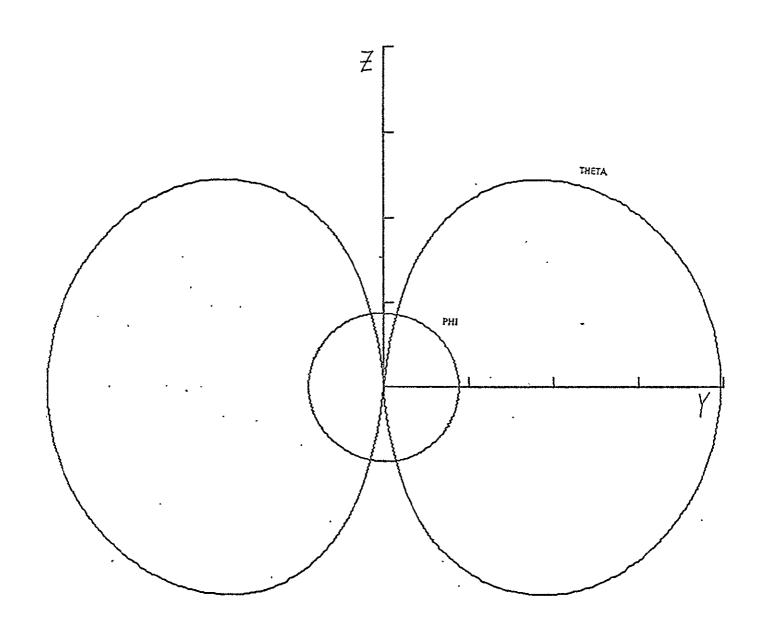


FIGURE B-106

FREQUENCY (MHZ) .3/1

V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX - 13.8

DB MIN - 33.8

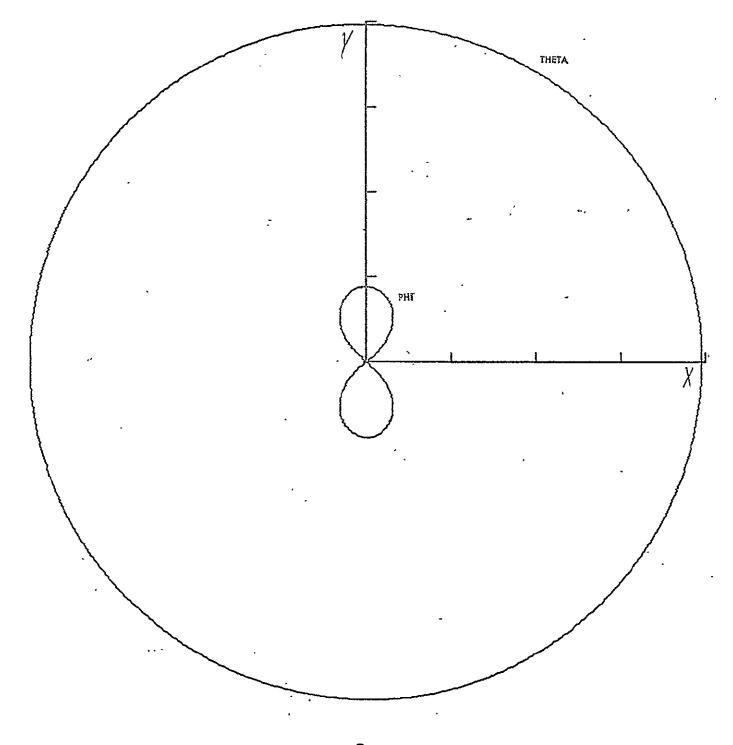


FIGURE B-107

F. EQUENCY (MHZ) . 311

V-A. IT. LENGTH (FT) 450

INIODE BALANCED

DB MAX - 13.8

DB MIN -33.8

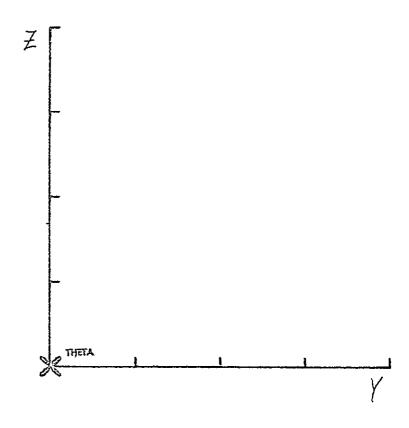


FIGURE $\beta - 108$ FREQUENCY (MHZ) .311

V-ANT. LENGTH (FT) 450

MODE UNDALANCED

DB MAX - 13.8

D3 MIN -39.8

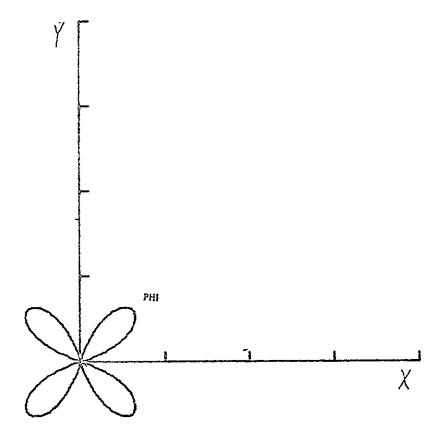


FIGURE B-109
FREQUENCY (MHZ) .3/1
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX -13.8
DB MIN -33.8

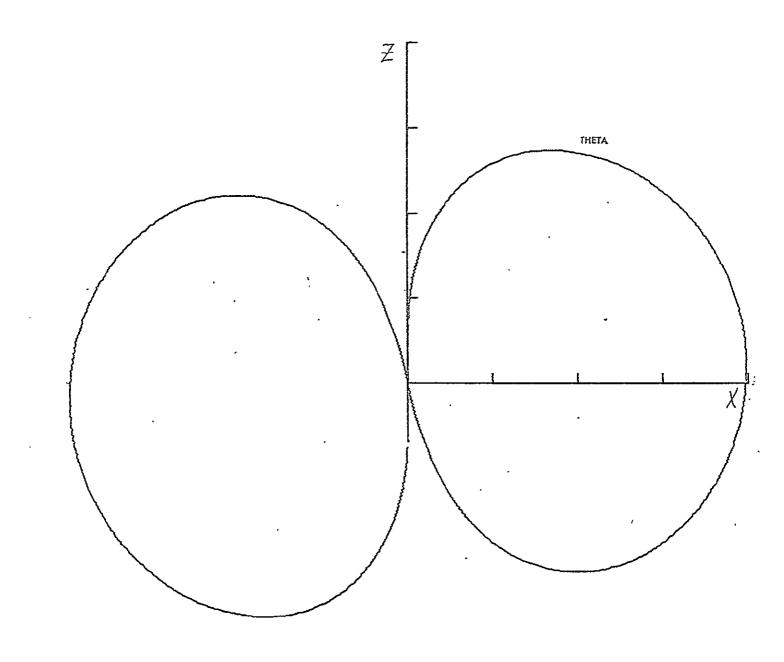


FIGURE B-110

FREQUENCY (MMZ) .369

V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX - 11.3

DB MIN -31.3

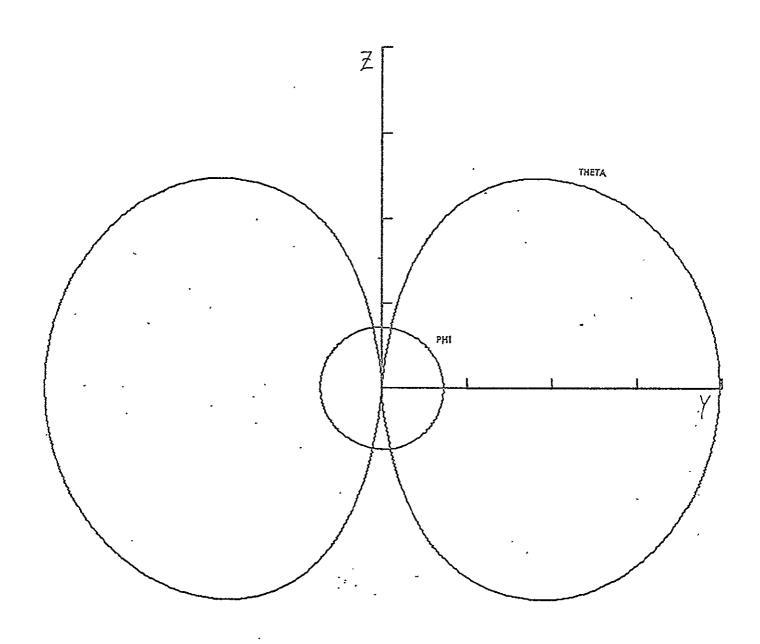


FIGURE B-111

FREQUENCY (MHZ) .369

V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX -11.3

DB MIN -31.3

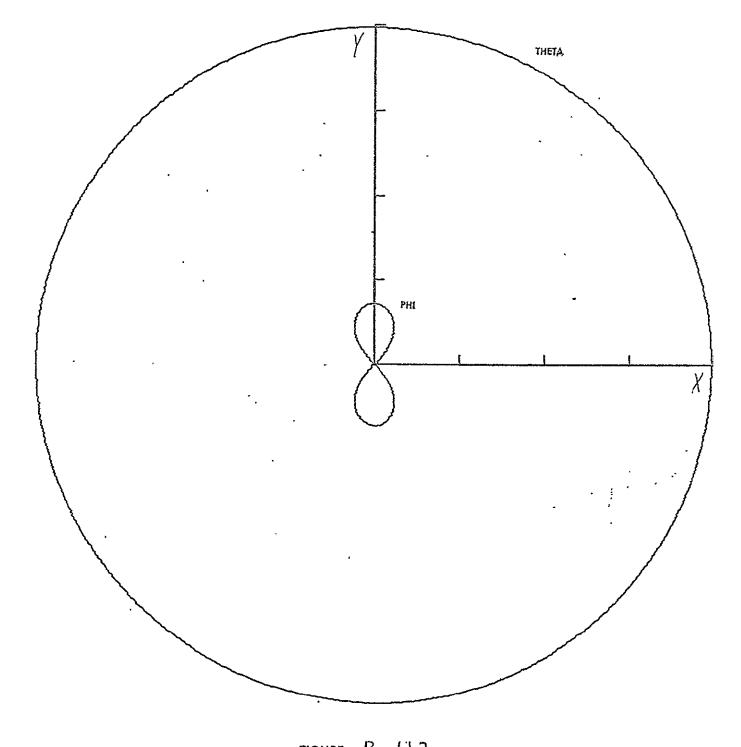


FIGURE B-112

FREQUENCY (MHZ) .369

V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX - 11.3

DB MIN - 31.3

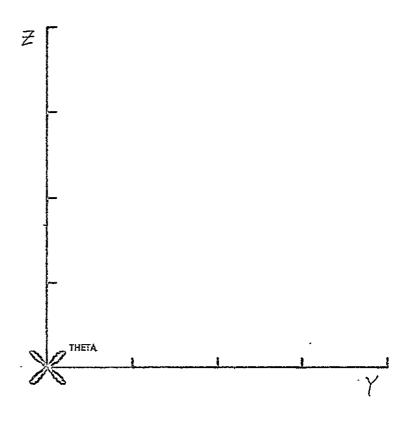


FIGURE B-113

FREQUENCY (MHZ) .369
V-ANT. LENGTH (FT) .450
MODE UNRALANCED
DB MAX - 11.3
DB MIN - 31.3

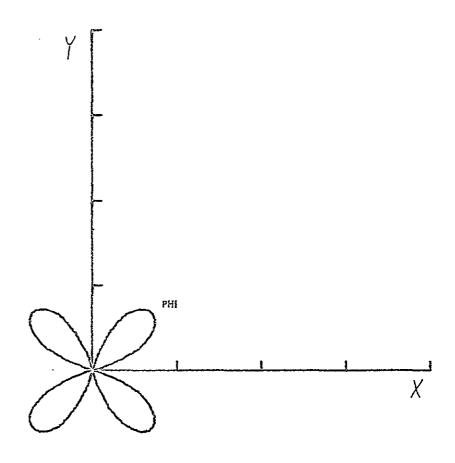


FIGURE B-114

FREQUENCY (MHZ) .369
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX - 11.3
DB MIN - 31.3

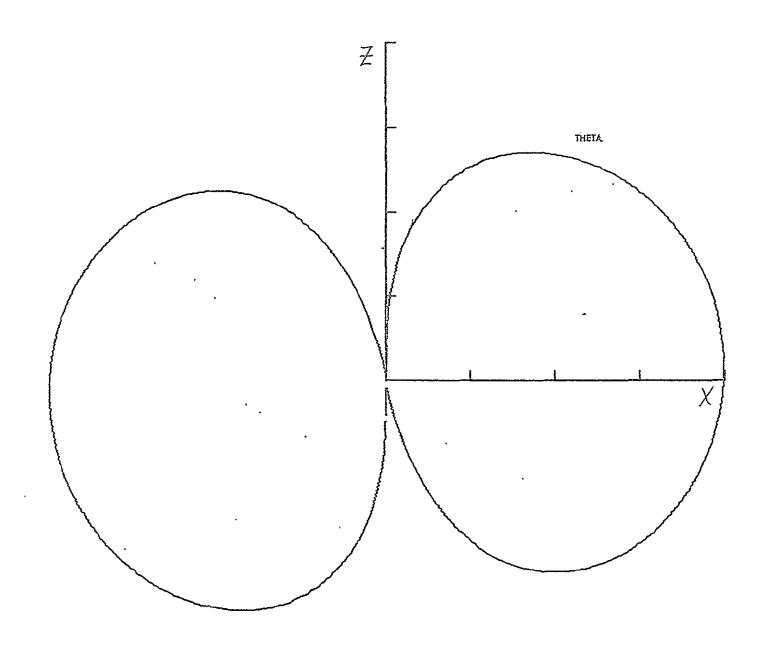
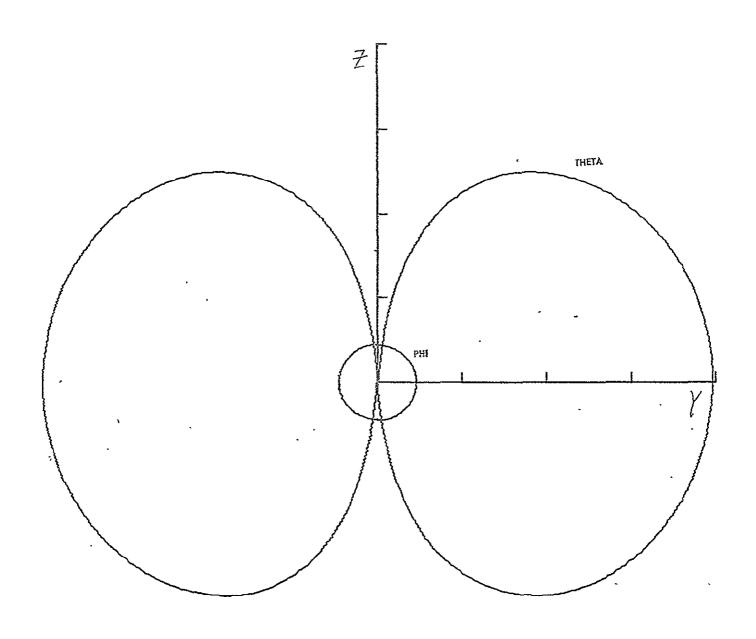


FIGURE B-115

FREQUENCY (MHZ) .450
V-ANT. LENGTH (FT) . 450
MODE BALANCED
DB MAX - 7,8
DB MIN - 27,8

0



FREQUENCY (MHZ) .450 V-ANT. LENGTH (FT) 450 MODE BALANCED DB MAX - 7.8 DB MIN - 27.8

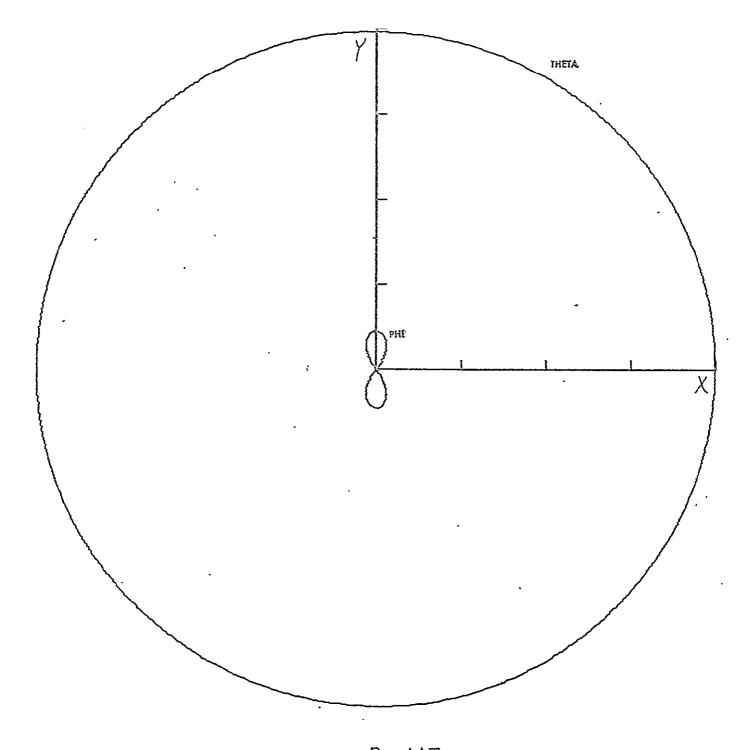


FIGURE B-117

FREQUENCY (MHZ) .450

V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX - 7.8

DB MIN - 27-8

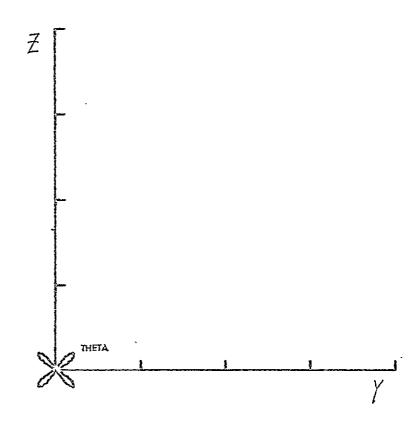


FIGURE B-18

FREQUENCY (MHZ) . 450
Y-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX .- 7.8
DB MIN -27.8

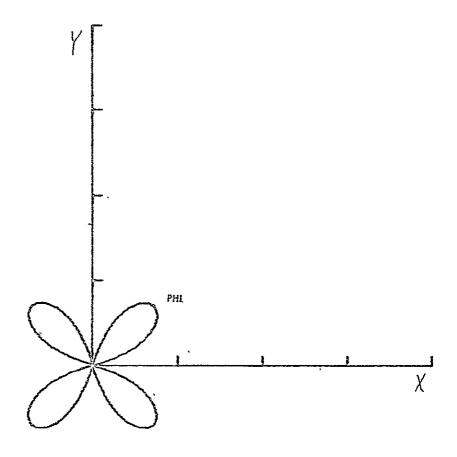


FIGURE B-119

FREQUENCY MM2) .450

V-ANT. LENGTH [M] 450

MODE UNBALANCED

DB MAX - 7.8

DB MIN - 27.8

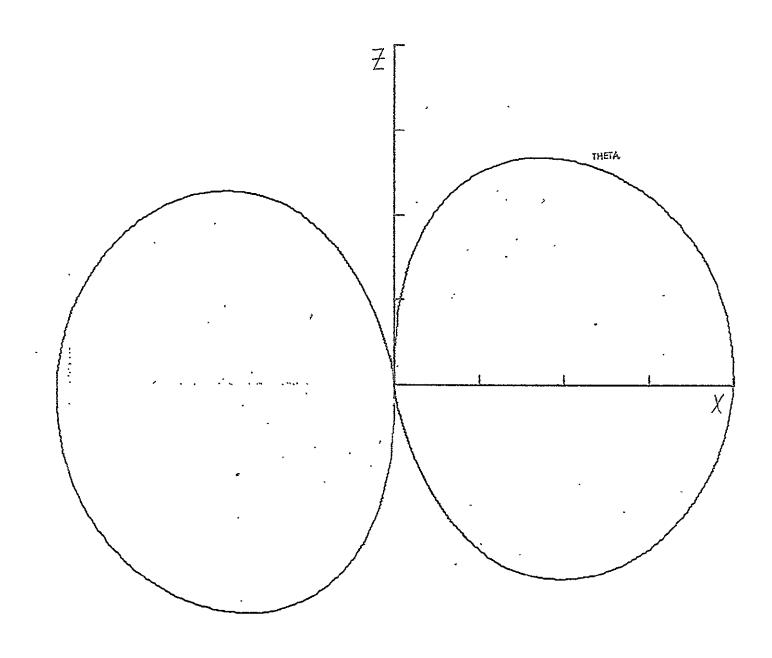


FIGURE B-120

FREQUENCY (MHZ) .540

V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX - 4.3

DB MIN -24.3

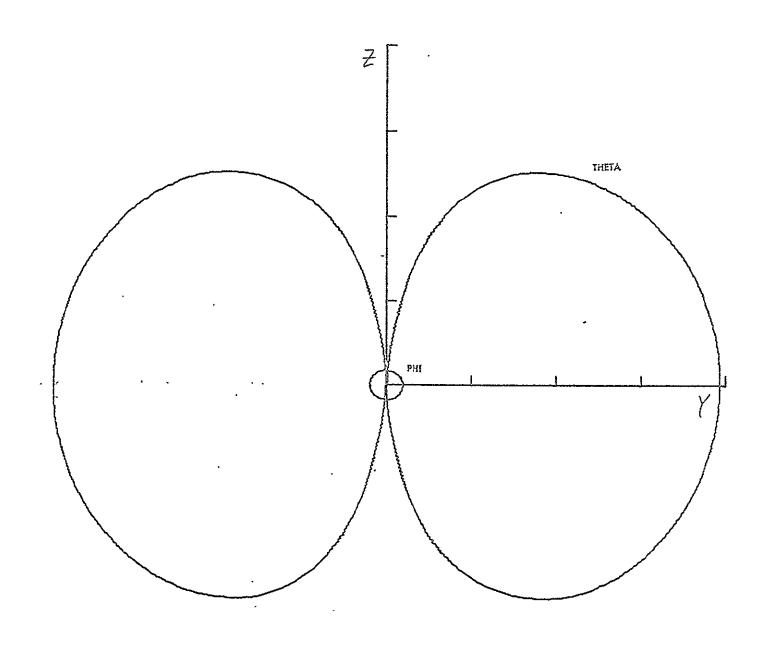


FIGURE B-121

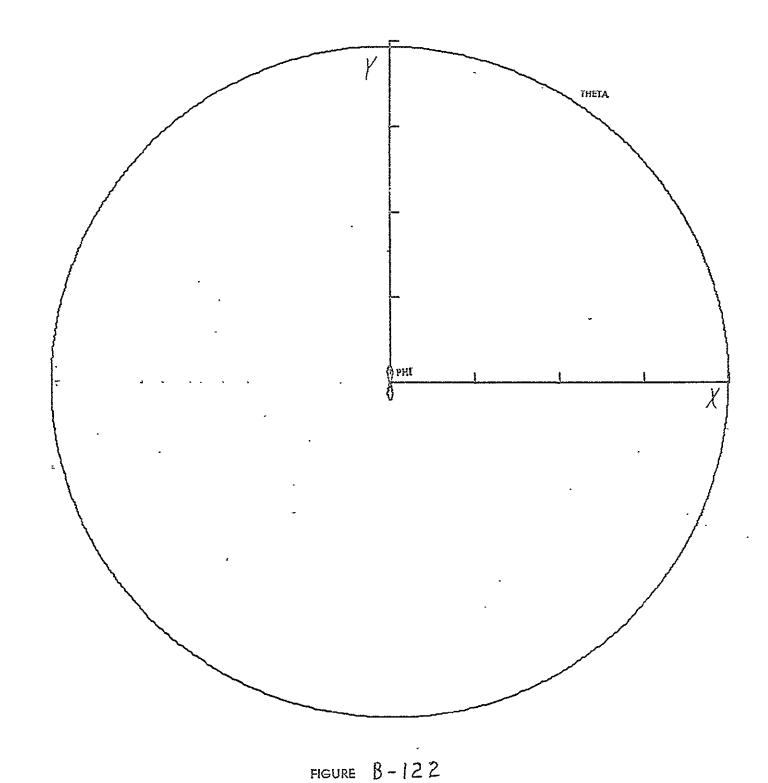
FREQUENCY (MHZ) .540

V-ANT. LENGTH (FT)

MODE BALANCED

DB MAX - 4.3

DB MIN -24.3



FREQUENCY (MHZ) .540
V-ANT. LENGTH (FT) 450
MODE. BALANCED
DB MAX — 4.3
DB MIN — Z4.3

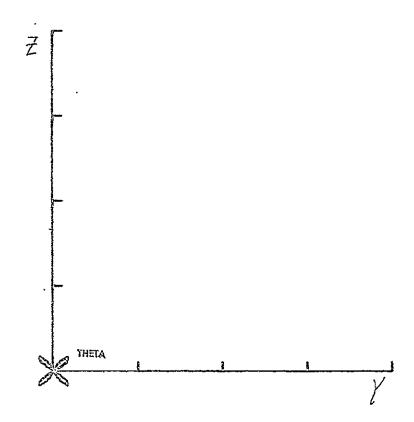
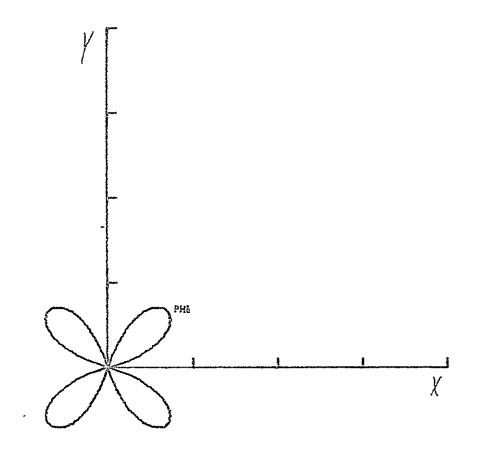


FIGURE B-123
F. EQUENCY (MHZ) .5+0
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX - 4.3
DB MIN - 24.3



FREQUENCY (MHZ) .5+0 V-ANT. LENGTH (FT) 450 MODE UNBALANCED 450 DB MAX - 4.3 DB MIN -24.3

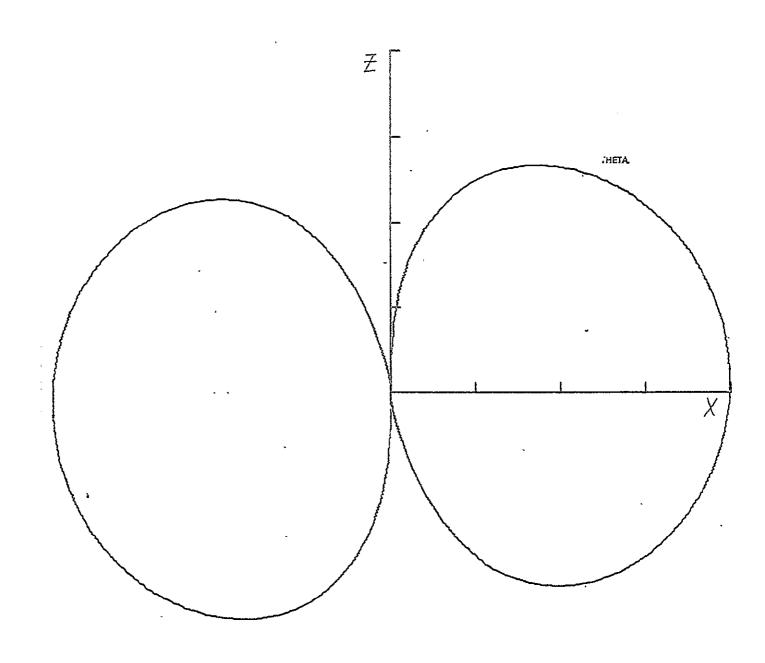


FIGURE B-125

FREQUENCY (MHZ) .700

V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX - 1.5

DB MIN - 21.5

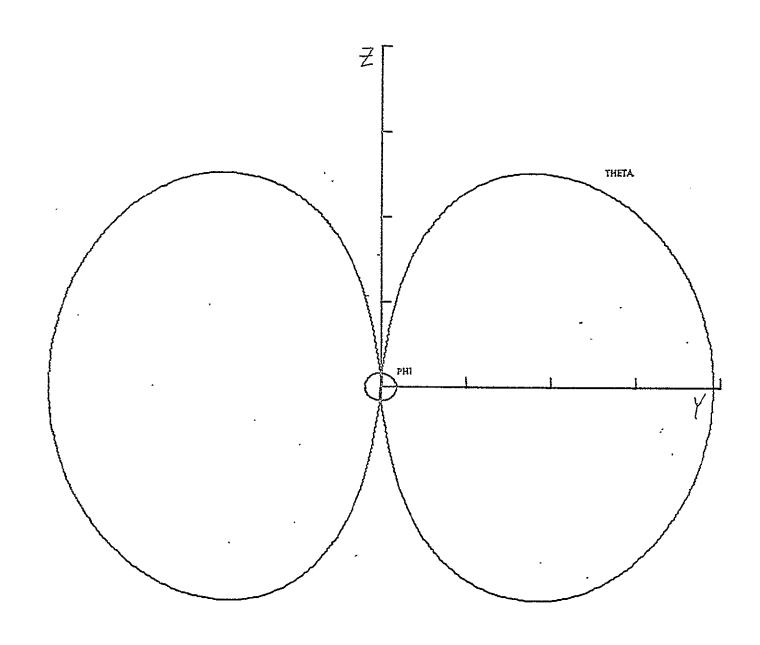


FIGURE B-126

FREQUENCY (MHZ) .700

V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX - .1.5

DB MIN - 21.5

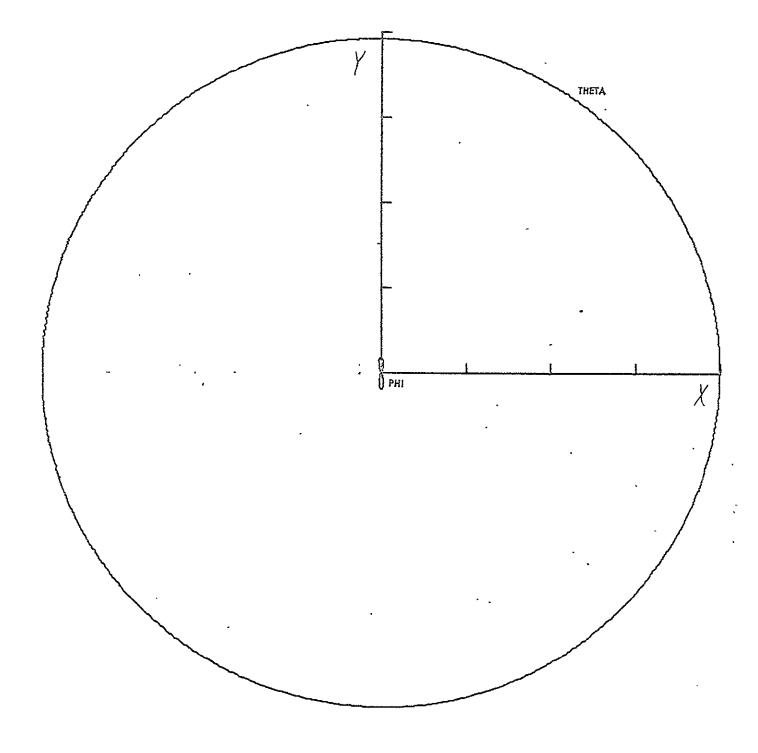


FIGURE B-127

FREQUENCY (MHZ) .700 .
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX — 1.5
DB MIN — 21.5

B-128

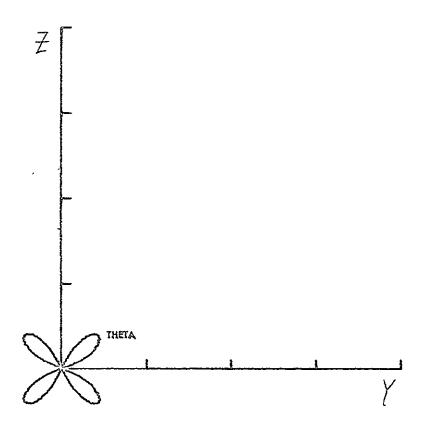


FIGURE B-128

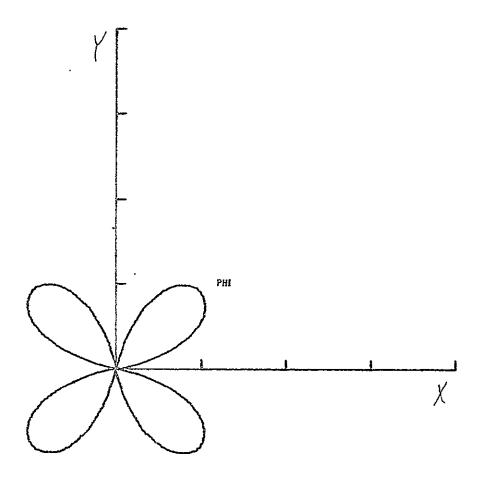
FREQUENCY (MHZ) .700

V-ANT. LENGTH (FT) 450

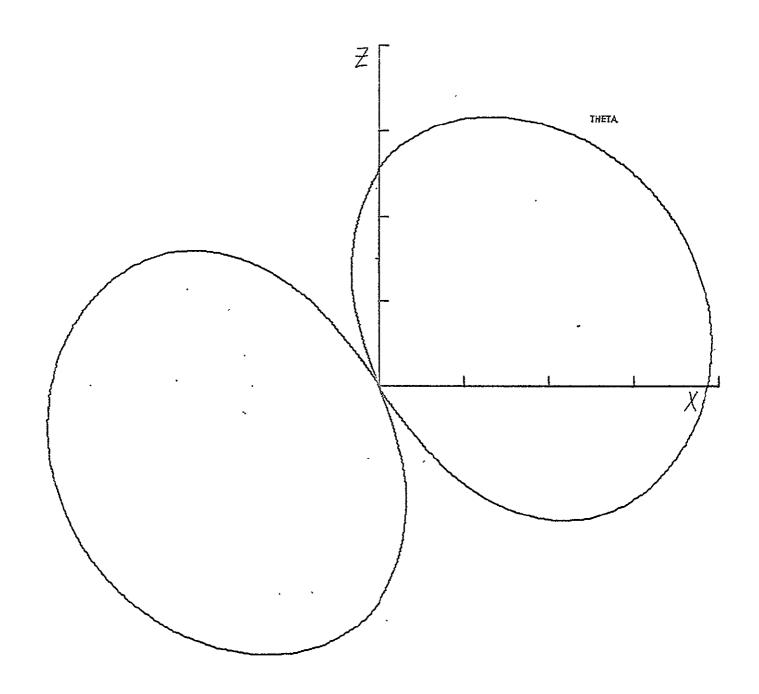
MODE UNGALANCED

DB MAX - 1.5

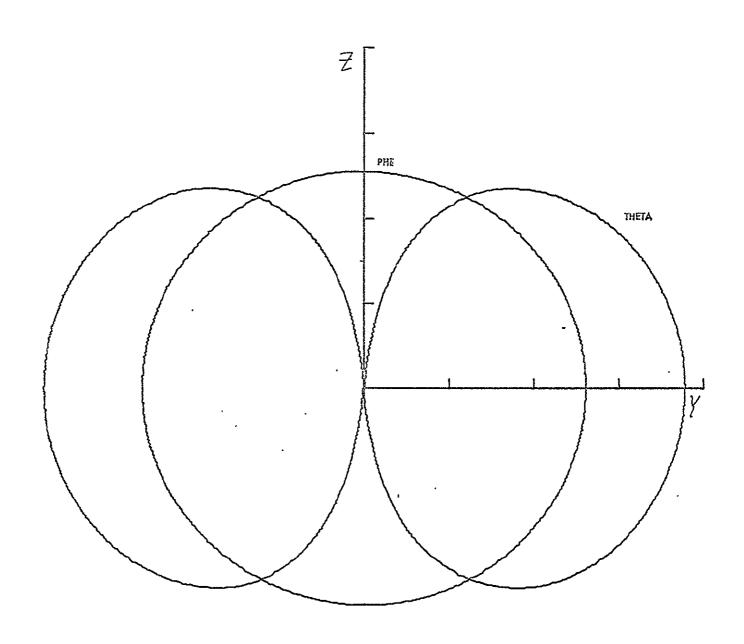
DB MIN -21.5



FREQUENCY (MHZ) ,700 V-ANT. LENGTH (FT) 450 MODE UNBALANCED DB MAX — 1.5 DB MIN . — 21.5



FREQUENCY (MHZ) ,900
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX — 1.1
DB MIN — 21.1



FREQUENCY (MHZ) . 900 V-ANT. LENGTH (FT) 450 MODE BALANCED DB MAX — 1.1 DB MIN — 21.1

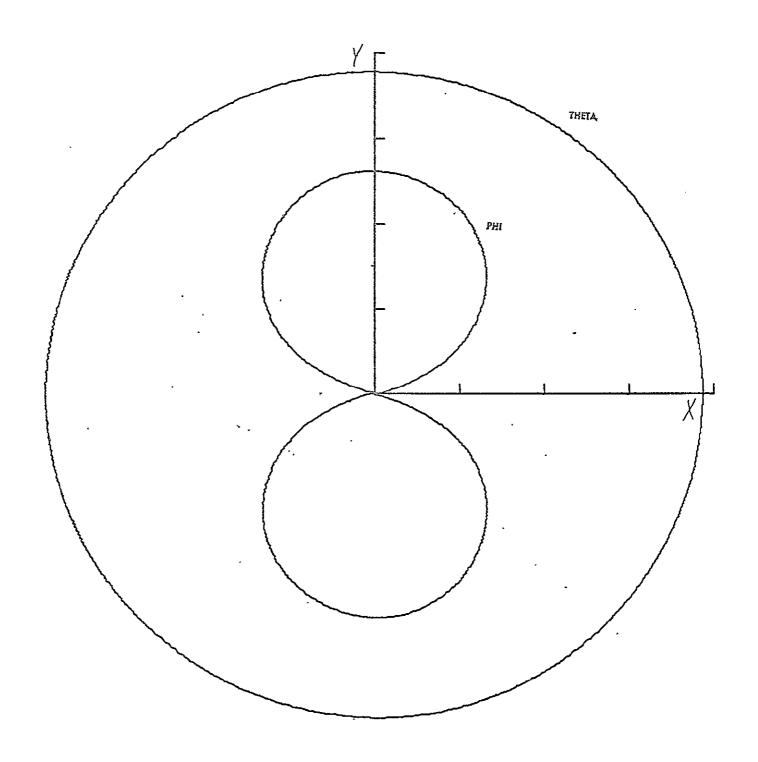


FIGURE B-132

FREQUENCY (MHZ) . 900

V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX — 1.1

DB MIN — 21.1

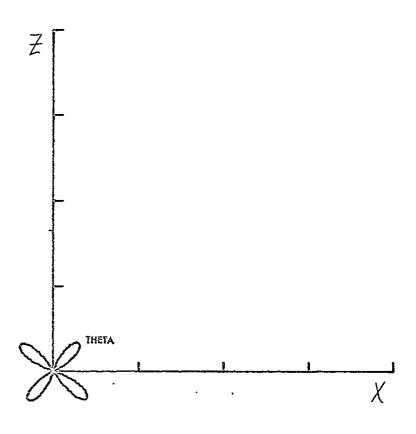


FIGURE B - 133

FREQUENCY (MHZ) . 900

V-ANT. LENGTH (FT)

MODE UNBALANCL.

DB MAX - 1.1

DB MIN - 21.1

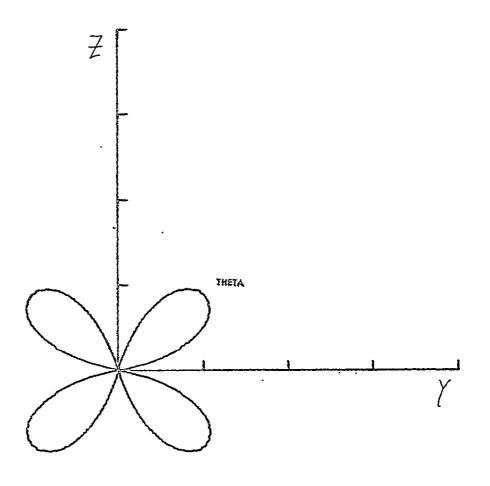


FIGURE B-134

FREQUENCY (MHZ) . 700

V-ANT. LENGTH (FT)

MODE UNBALANCED

DB MAX - 1.1

DB MIN -21.1

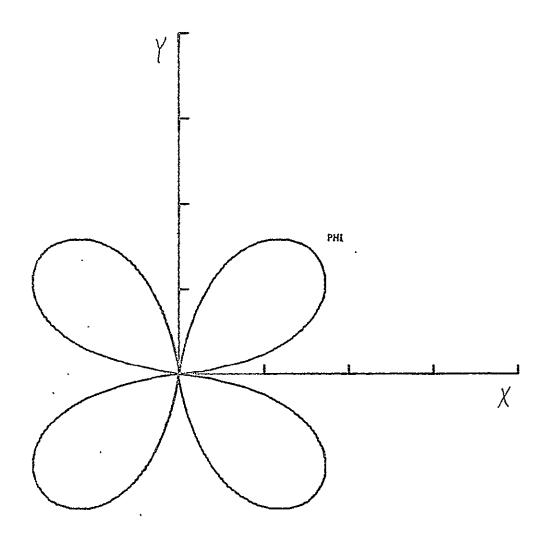


FIGURE B-135FREQUENCY [MHZ] . 900
V-ANT. LENGTH [FT] 450
MODE UNBALANCED
DB MAX — 1.1
DB MIN — 21.1

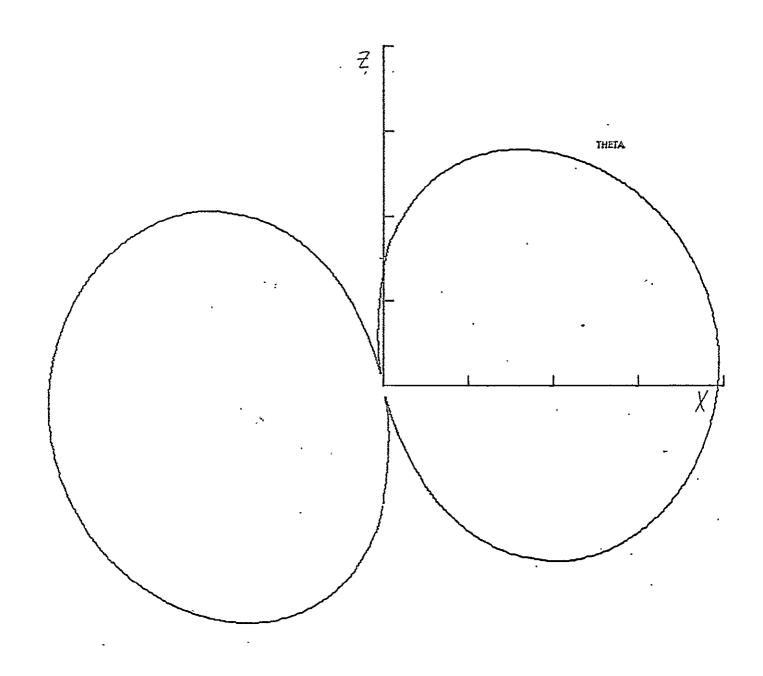


FIGURE B-136

FREQUENCY (MHZ) .995

V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX -0.8

DB MIN -20.8

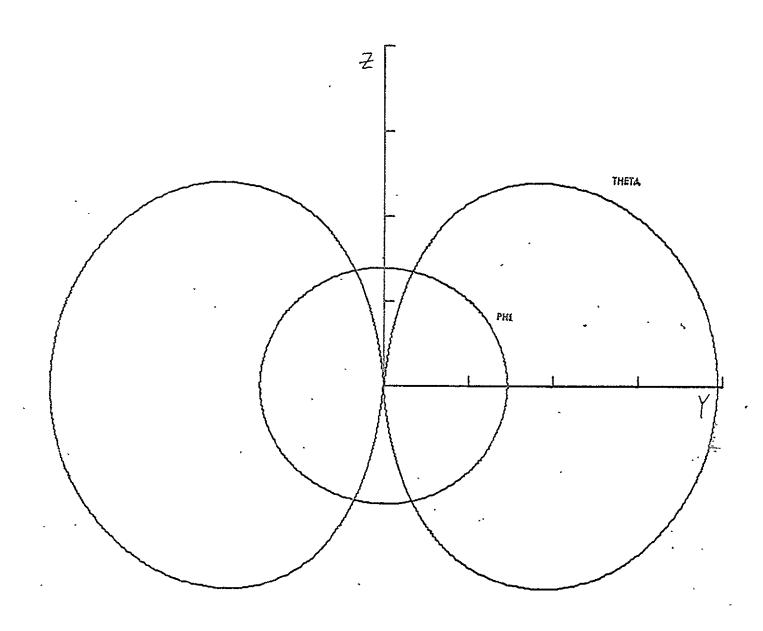


FIGURE B-137

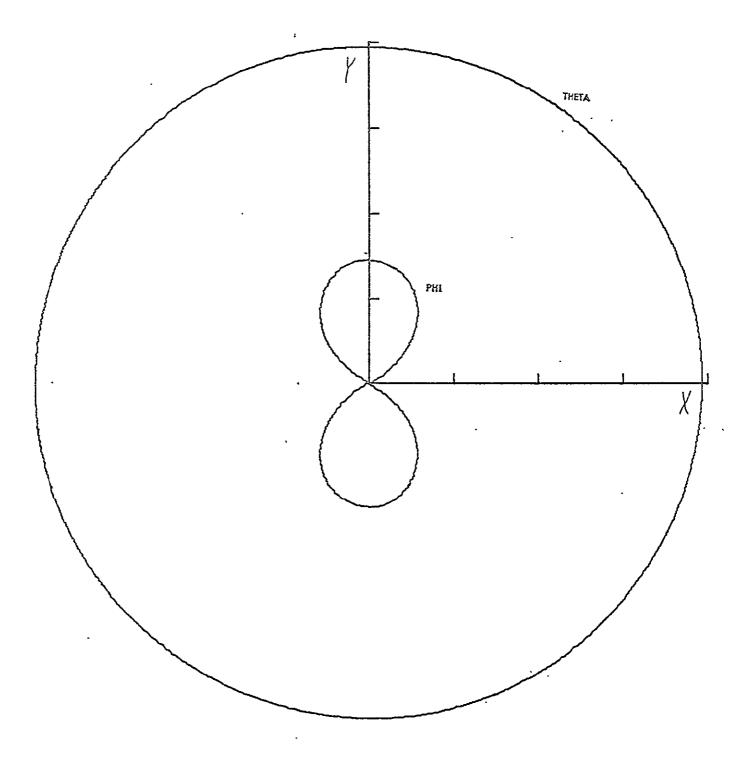
FREQUENCY (MHZ) .995

V-ANT. LENGTH [FT] 450

MODE BALANCED

DB MAX - 90.8

DB MIN -20.8



FREQUENCY (MHZ) .995 V-ANT. LENGTH (FT) 450 MODE BALANCED DB MAX - 0.8 DB MIN - 20.8

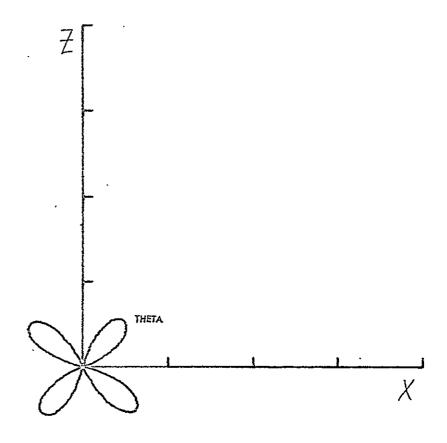


FIGURE B-139

FREQUENCY (MHZ) . 995

V-ANT. LENGTH (FT) . 450

MODE UNBALANCED

DB MAX - 0.8

DB MIN - 20.8

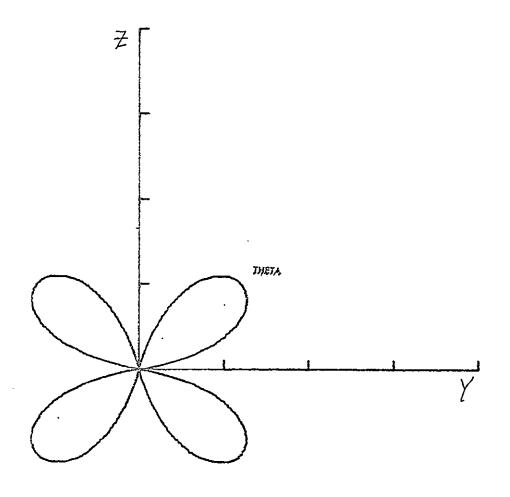


FIGURE B-140

FREQUENCY (MHZ) .995

V-ANT. LENGTH (FT) 450

MODE UNBALANCED

DB MAX - 0.8

DB MIN - 20.8

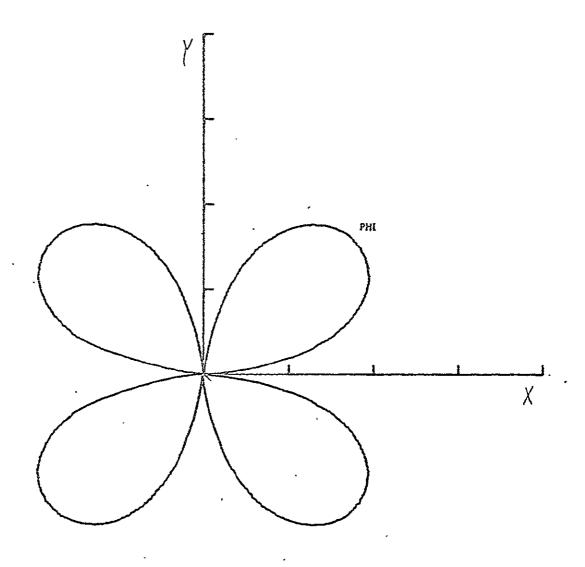


FIGURE B-141

FREQUENCY (MHZ) • 995

V-ANT. LENGTH (FT) 450

MODE UNBALANCED

DR MAX - 0.8

DB MIN - 20.8

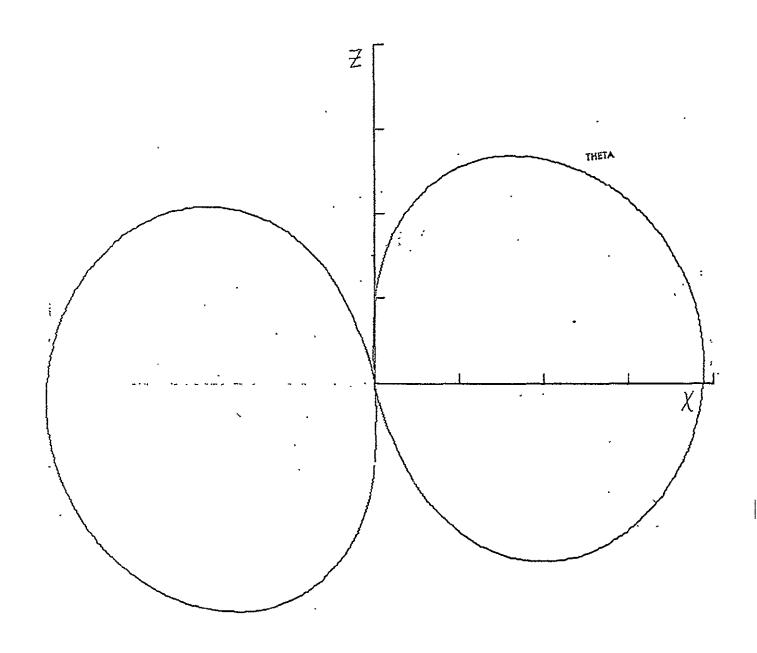


FIGURE B-142

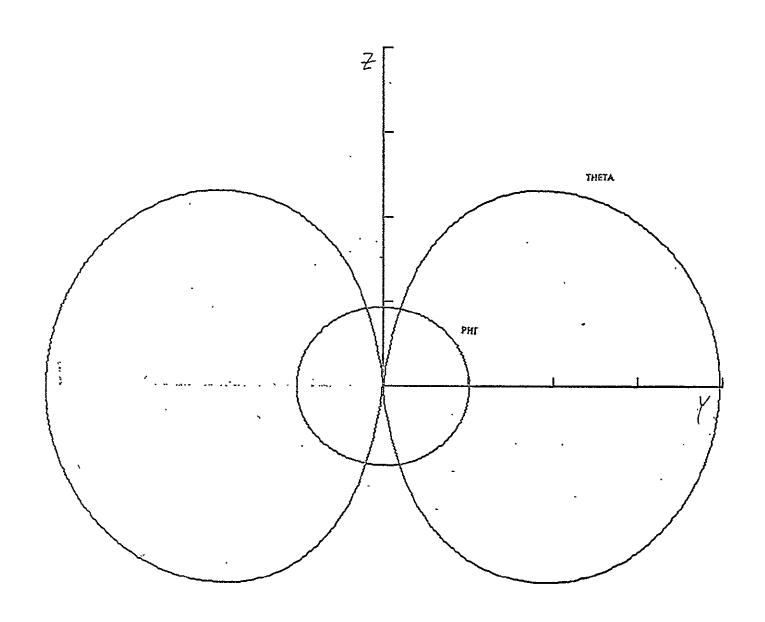
FREQUENCY (MHZ) 1.107

V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX - 0.3

DB MIN -20.3



FREQUENCY (MHZ) 1.107 V-ANT. LENGTH (FT) 450 MODE BALANCED DB MAX — 0.3 DB MIN — 20.3

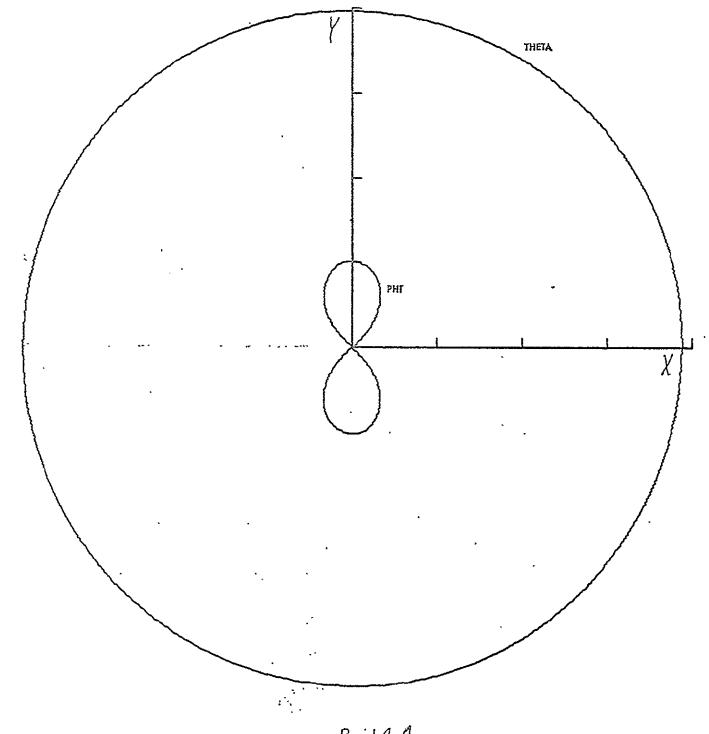


FIGURE B-144

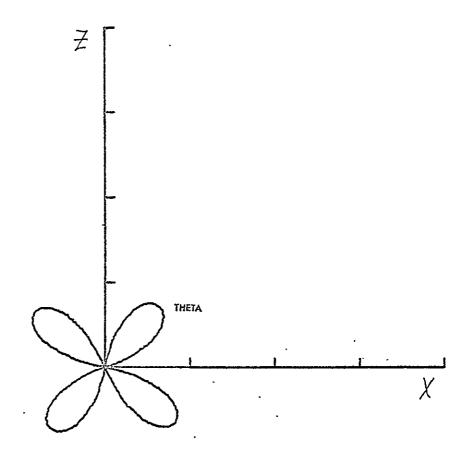
FREQUENCY (MHZ) 1.107

V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX - 0.3

DB MIN - 20.3



FREQUENCY (MHZ) 1.107 V-ANT. LENGTH (FT) 450 MODE UNBALANCED DB MAX - 0.3 DB MIN - 20.3

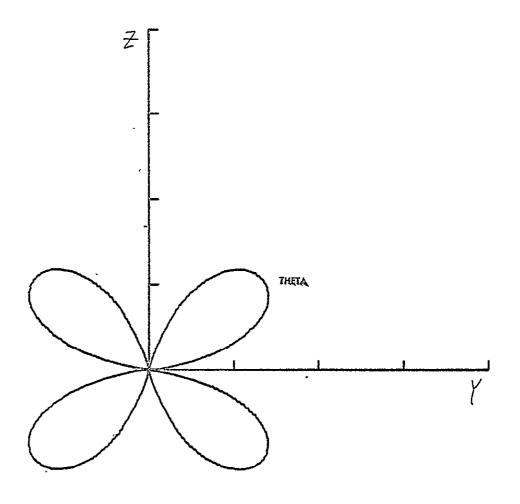
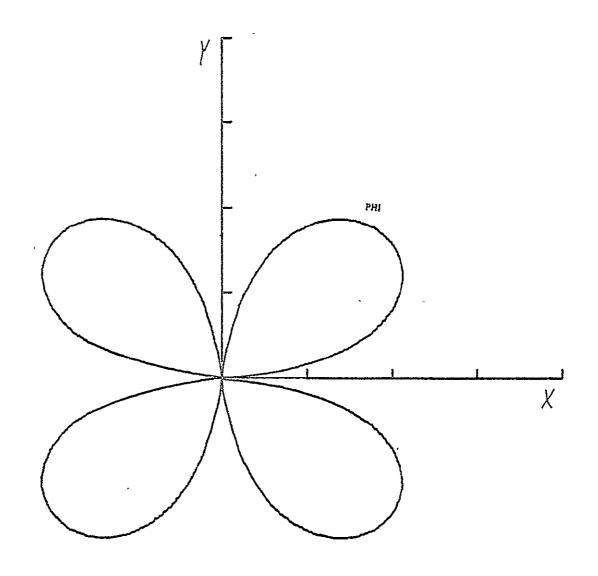


FIGURE B-146

FREQUENCY (MHZ) 1.107

V-ANT. LENGTH (FT) 450

MODE UNBALANCED
DB MAX - 0.3
DB MIN - 20.3



FREQUENCY (MHZ) 1.107 V-ANT. LENGTH (FT) 450 MODE UNBALANCED DB MAX - 0-3 DB MIN - 20.3

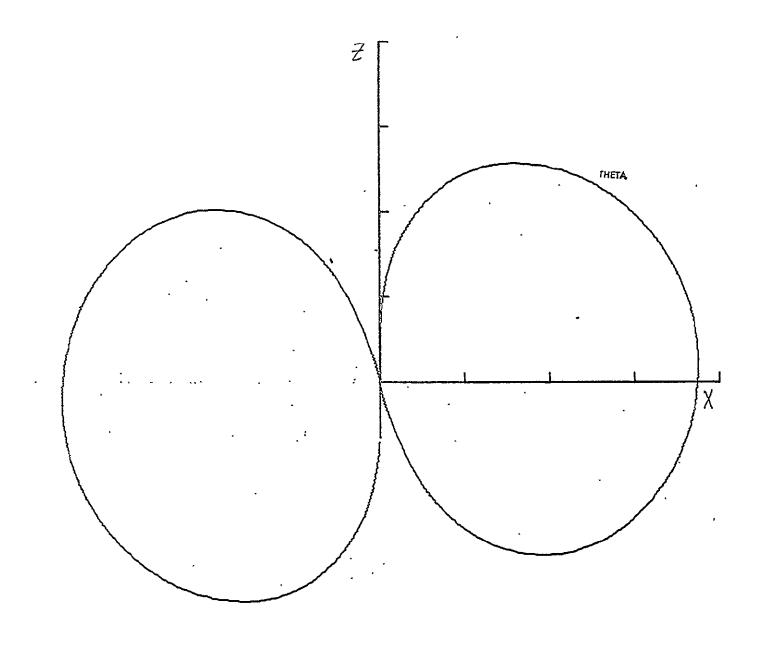


FIGURE B-148

FREQUENCY (MHZ) 1.31

V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX + 0.7

DB MIN -19.3

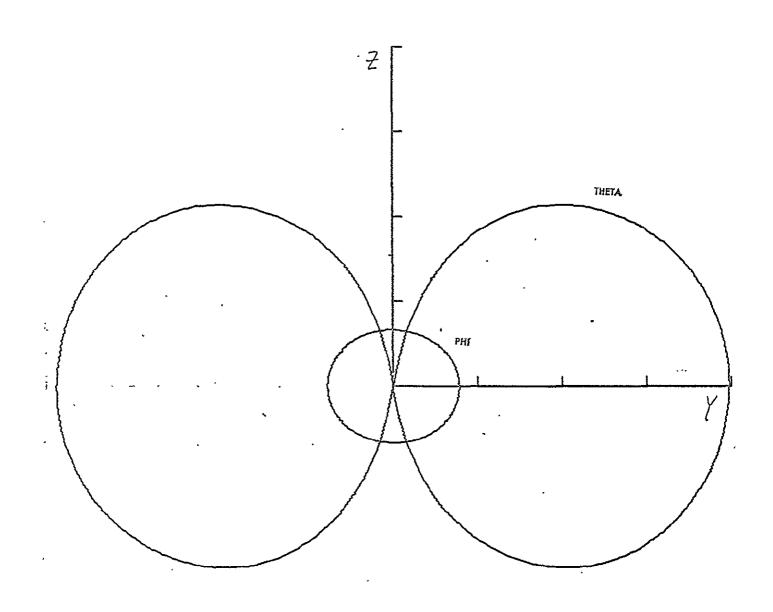


FIGURE B-149

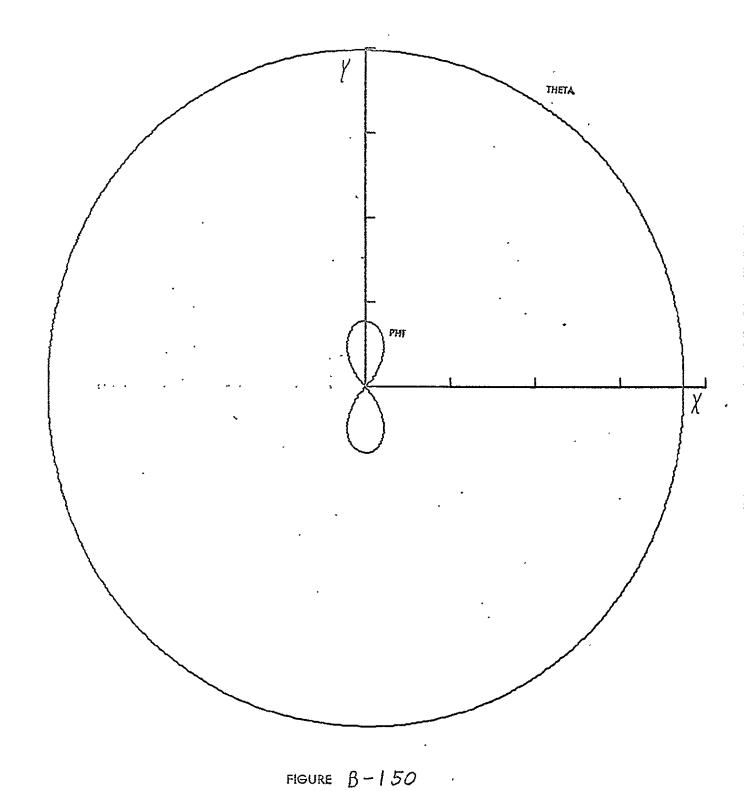
FREQUENCY (MHZ) 1.31

V-ANT. LENGTH (FT) 450

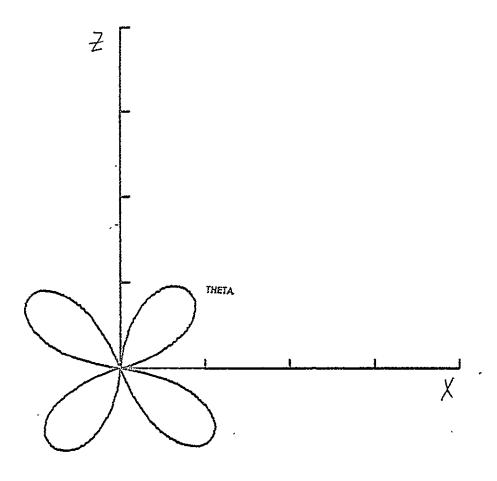
MODE BALANCED

DB MAX + 0.7

DB MIN : -19.3



FREQUENCY (MHZ) 1.31
V-ANT. LENGTH (FT) 450.
MODE BALANCED
DB MAX + 0.7
DB MIN - 19.3



FREQUENCY (MHZ) 1.31 V-ANT. LENGTH (FT) 450 MODE UNBALANCED DB MAX + 0.7 DB MIN -19.3

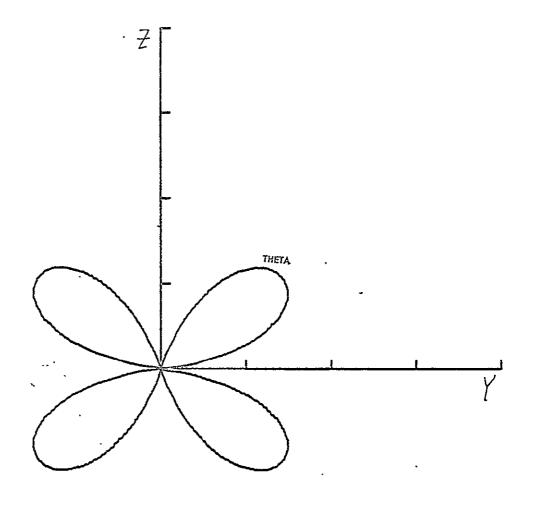


FIGURE B-152

FREQUENCY (MHZ) 1.3/
V-ANT. LENGTH (FT) 450

MODE UNBALANCED

DB MAX + 0.7

DB MIN -19.3

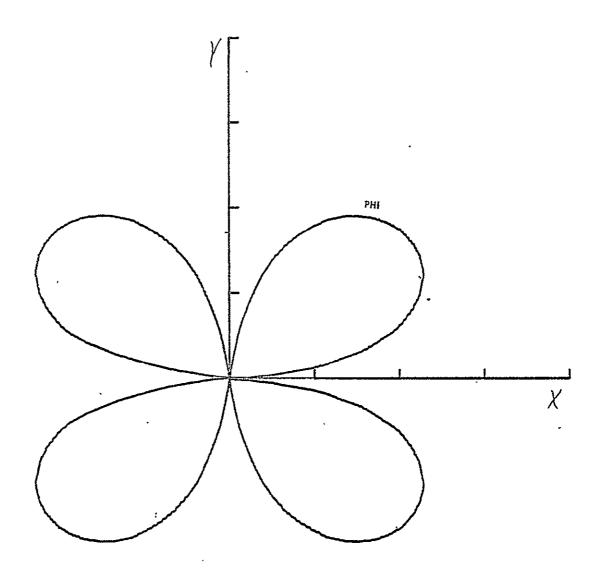


FIGURE B-153

FREQUENCY (MHZ) 1.31

V-ANT. LENGTH (FT) 450

MODE UNBALANCED

DB MAX + 0.7

DB MIN - 19.3

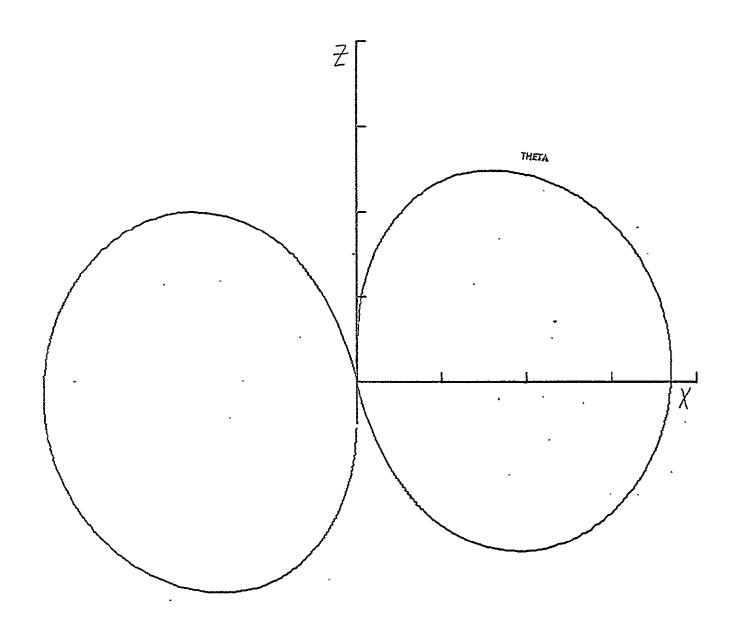


FIGURE B-154

FREQUENCY [MHZ] 1.65

V-ANT. LENGTH (FT):, 450

MODE BALANCED

DB MAX + 1.1

DB MIN -18-9

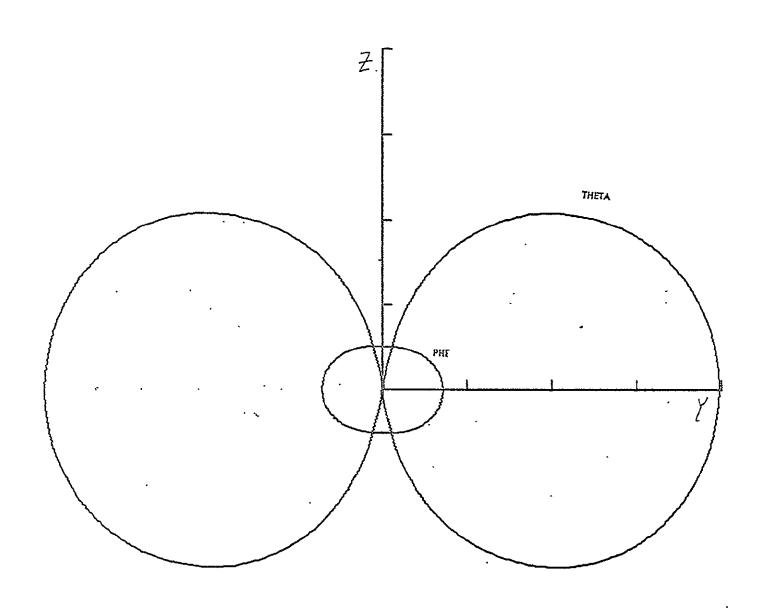


FIGURE B-155

FREQUENCY (MHZ) 1.65

V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX + 1.1

DB MIN -18.9

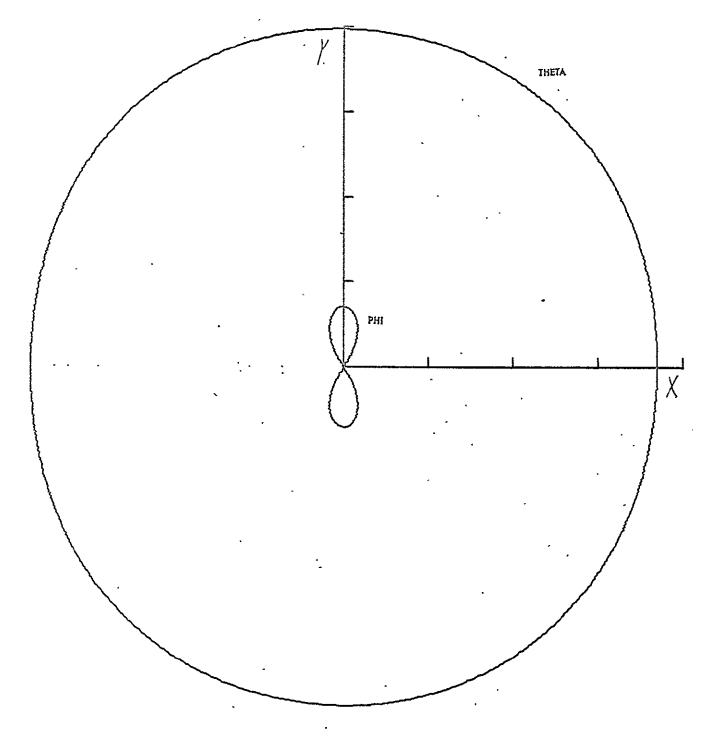


FIGURE B-156

FREQUENCY (MHZ) 1.65 V-ANT. LENGTH (FT) 450 MODE BALANCED DB MAX + 1.1 DB MIN - 18.9

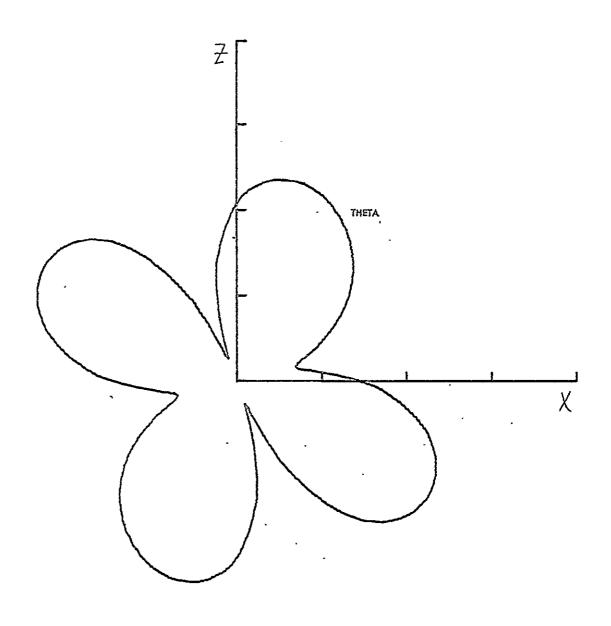
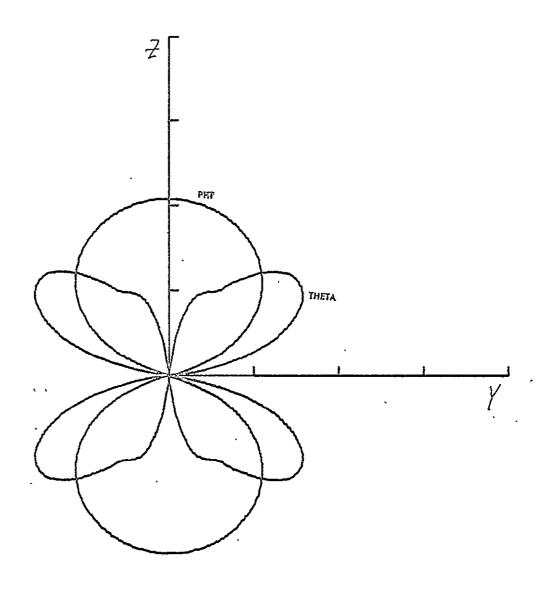


FIGURE B-157

FREQUENCY (MHZ) 1.65

V-ANT. LENGTH (FT) 450

MODE UNBALANCED
DB MAX + 1.1
DB MIN -18.9



FREQUENCY (MHZ) 1.65 V-ANT. LENGTH (FT) 450 MODE UNBALANCED DB MAX + 1.1 DB MIN - 18.9

B-159

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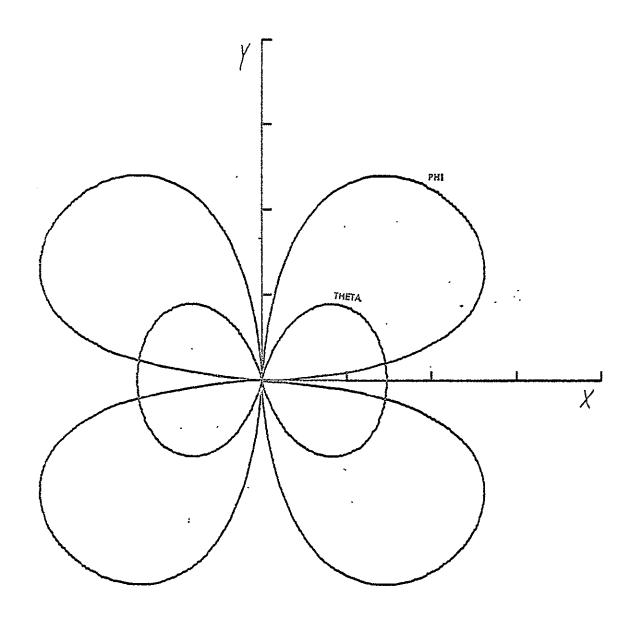


FIGURE B-159

FREQUENCY (MHZ) 1.65

V-ANT. LENGTH (FT) 450

MODE UNBALANCED

DB MAX + 1.1

DB MIN -10.9

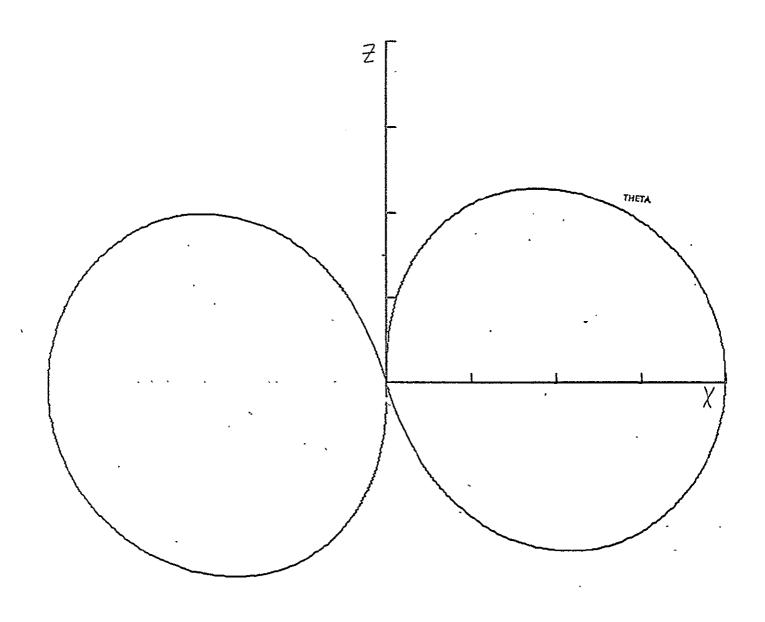


FIGURE B-160

FREQUENCY (MHZ) 2.20
V-ANT. LENGTH (FT) 450
MODE BALANCED
DE MAX + 2.0
DE MIN -18.0

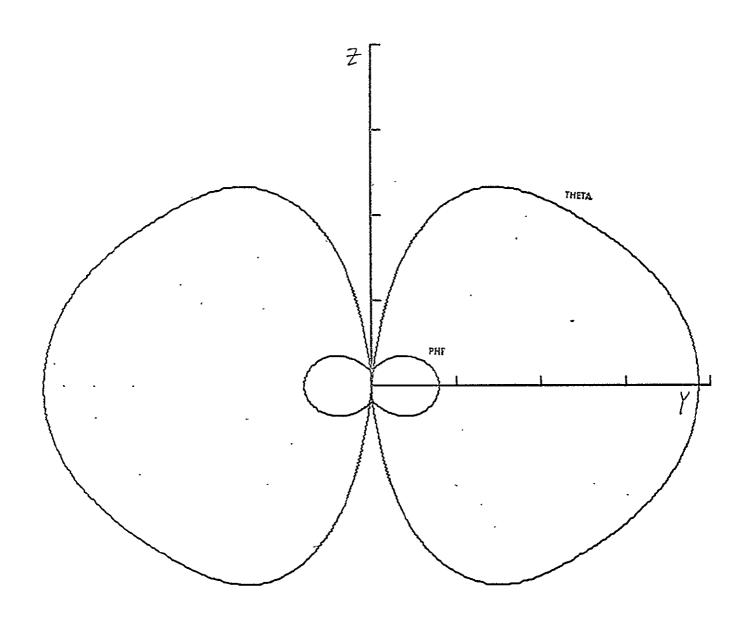


FIGURE B-161
F.EQUENCY (MHZ) 2.20
7-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 2.0
DB MIN -18.0

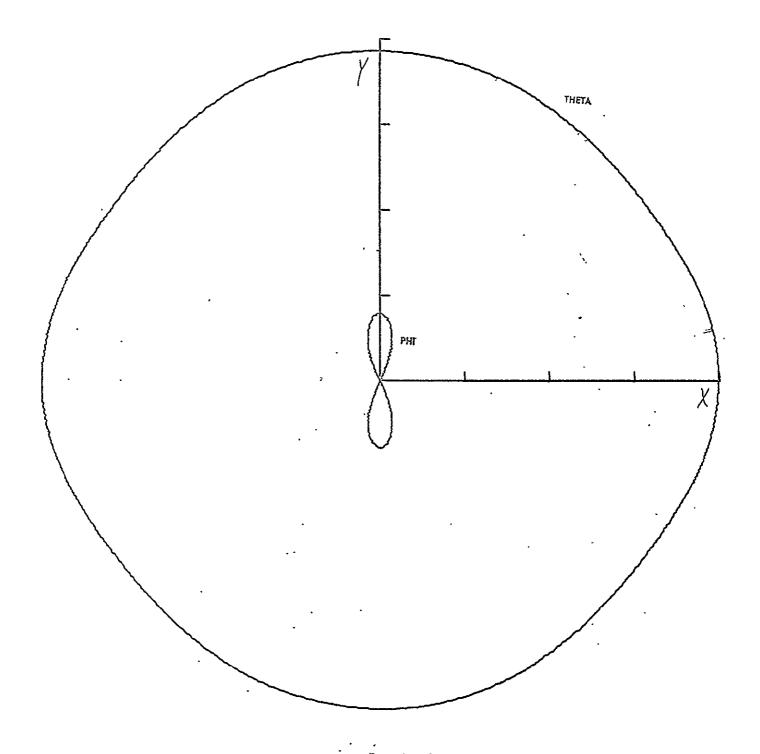
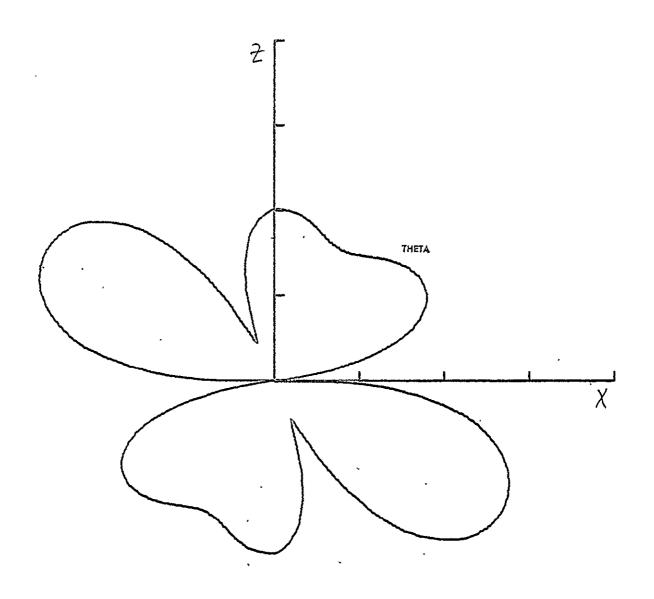
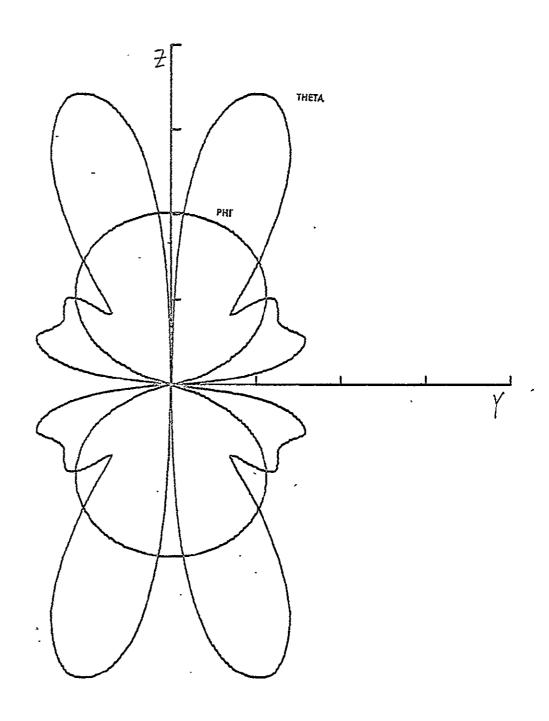


FIGURE B-162

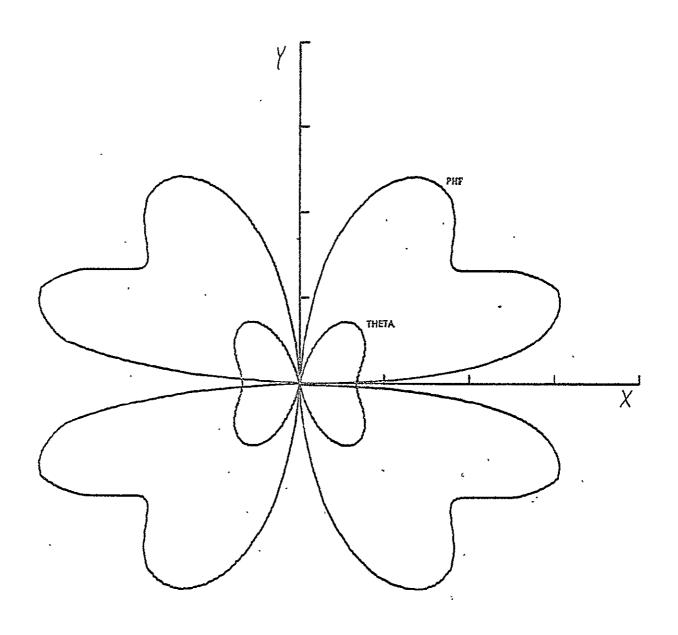
FREQUENCY (MHZ) 2.20
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 2.0
DE MIN -18.0



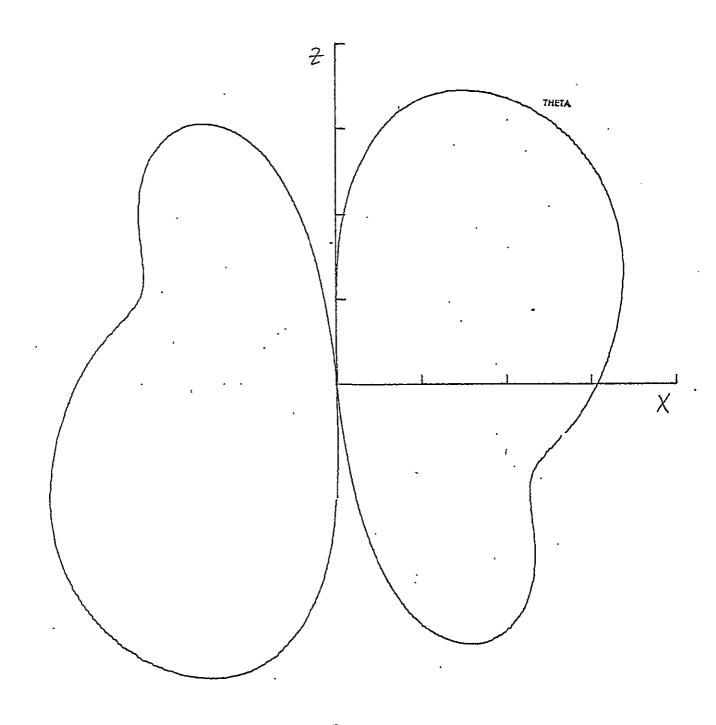
FREQUENCY (MHZ) 2.20 Y-ANT. LENGTH (FT) 450 MODE UNBALANCED. DB MAX + 2.0 DB MIN ,-18.0



FREQUENCY (MHZ) 2.20
V-ANT. LENGTH (FT)
MODE UNBALANCED
DB MAX + 2.0
DB MIN -18.0



FREQUENCY (MHZ) 2.20
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 2.0
DB MIN -18.0



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FIGURE B-166

FREQUENCY (MHZ) 2.80
V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX + 0.9
DB MIN - 19.1
```

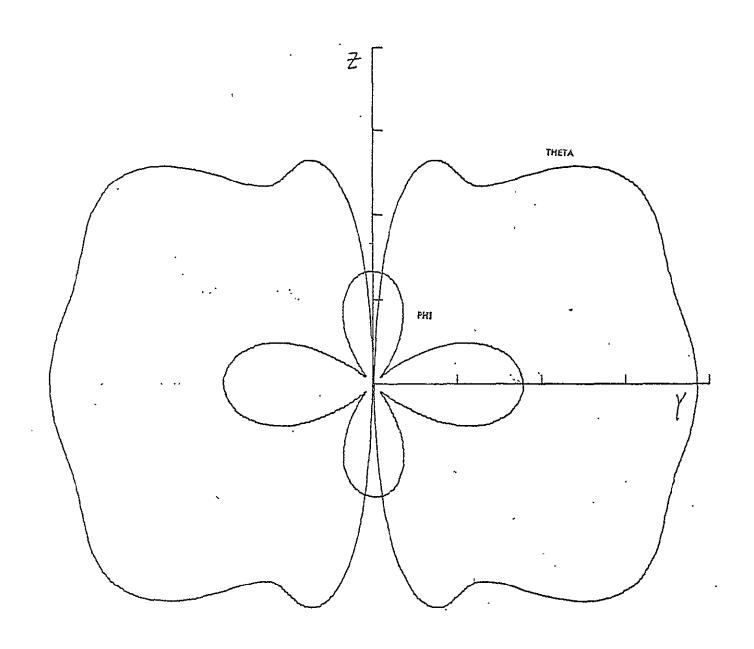


FIGURE B-167

FREQUENCY (MHZ) 2.80

V-ANT. LENGTH (FT) 450

MODE BAIANCED

DB MAX + 0.9

DB MIN - 19.1

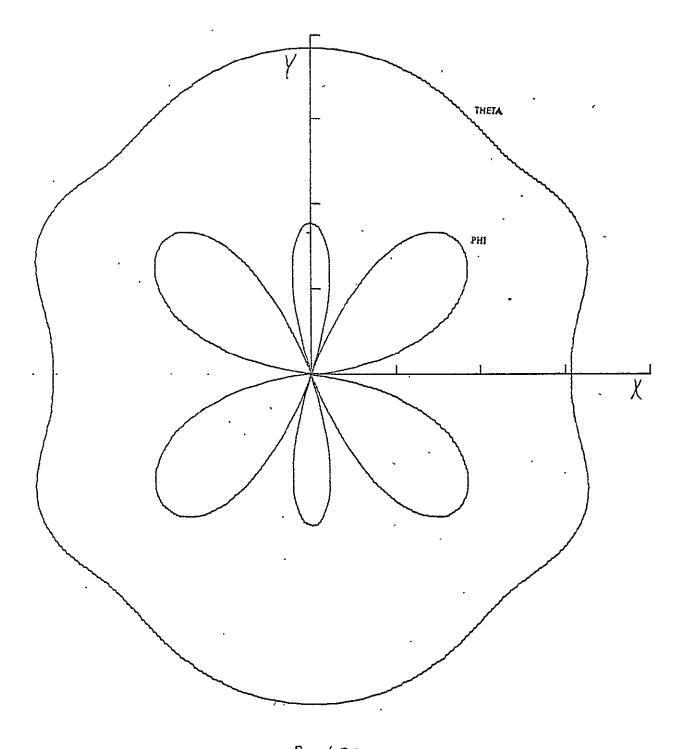


FIGURE B-168

FREQUENCY (MHZ) 2.80

V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX + 0.9

DB MIN -19.1

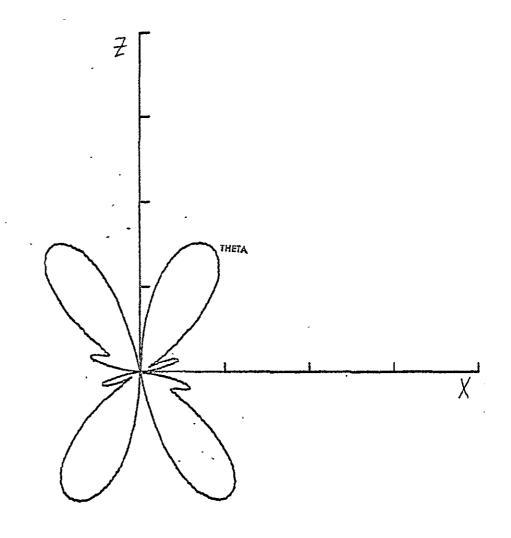


FIGURE B-169

FREQUENCY (MHZ) 2.80

V-ANT. LENGTH (FT) 450

MODE UNRALANCED

DB MAX + 0.9

DB MIN - 19.1

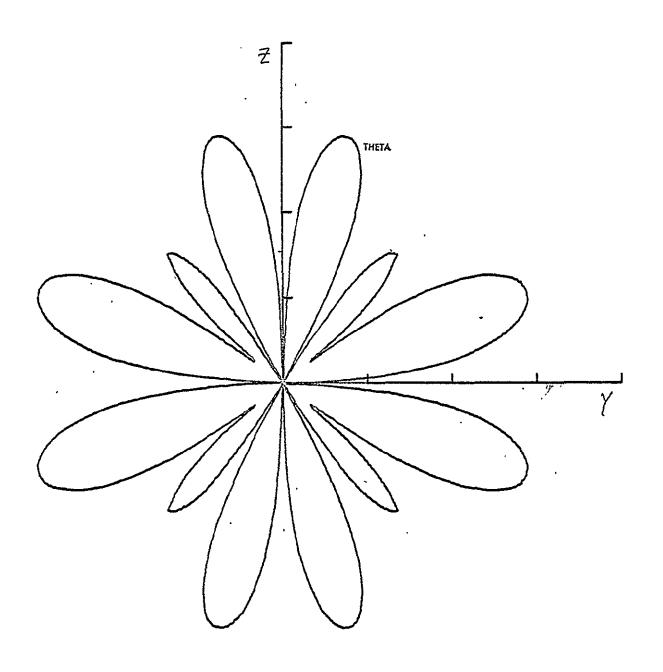


FIGURE B-170

FI

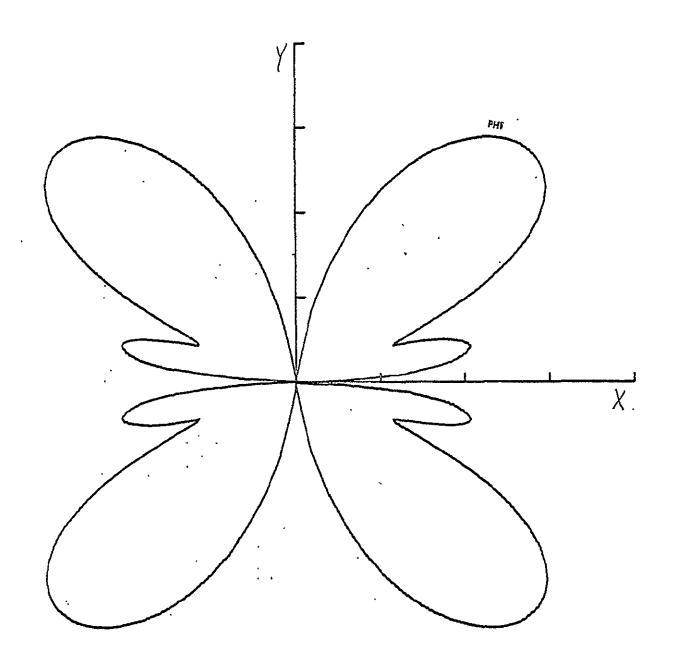


FIGURE B-171

FREQUENCY (MHZ) 2.80

V-ANT. LENGTH (FT) 450

MODE UNBALANCED 450

DB MAX + 0.9

DB MIN -19.1

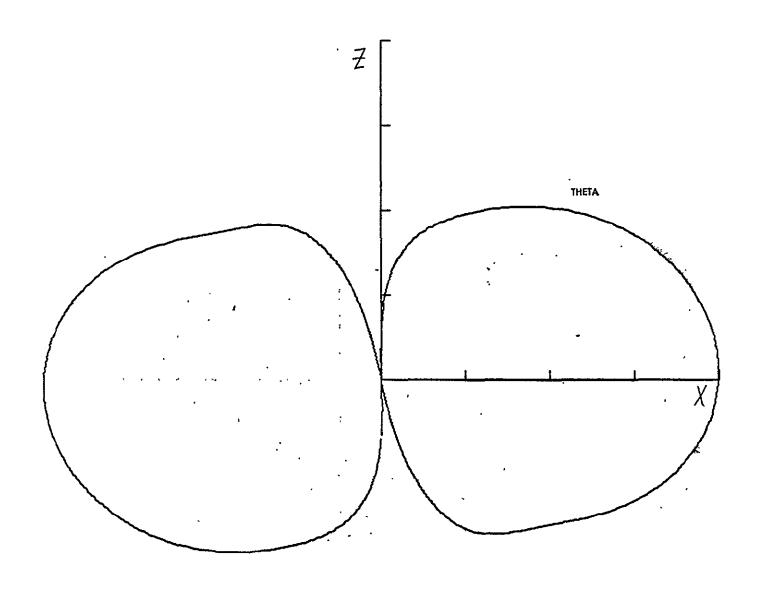


FIGURE B-172

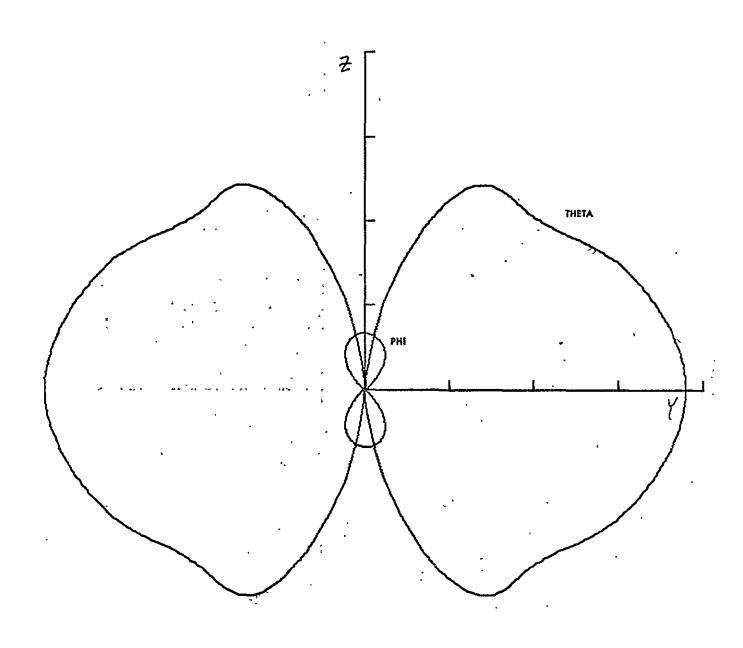
FREQUENCY (MHZ) 3.93

V-ANT. LENGTH (FT) 450

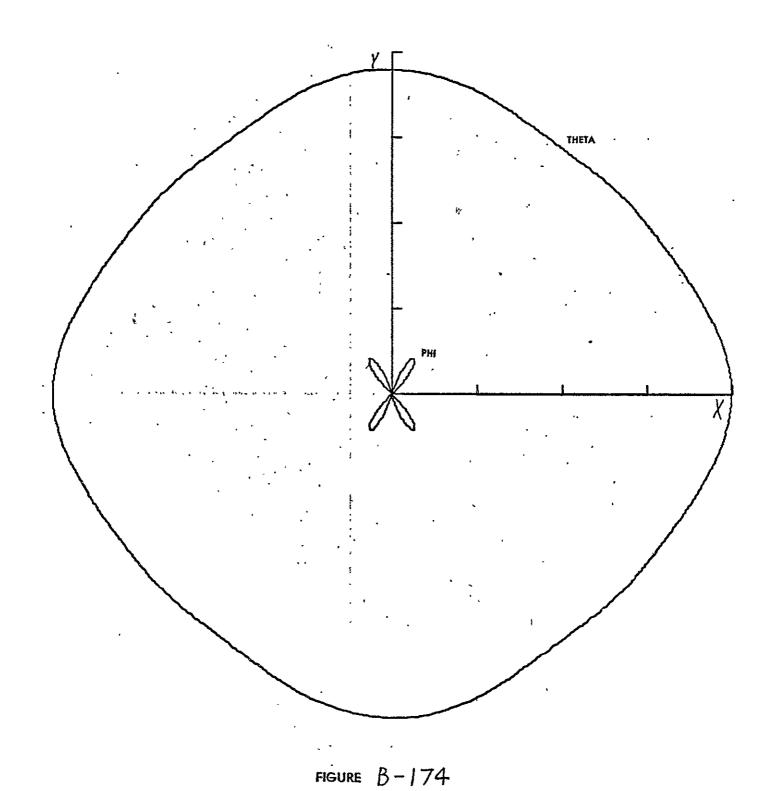
MODE. BALANCED

DB MAX + 2.7

DB MIN -17.1



FREQUENCY (MHZ) 3.93
V-ANT. LENGTH (FT)
MODE BALANCED
DB MAX + 2.9
DB MIN -17.1



Ø

FREQUENCY (MHZ) 3.93 V-ANT. LENGTH (FT) 450 MODE BALANCED DB MAX + 2.9 DB MIN -17.1

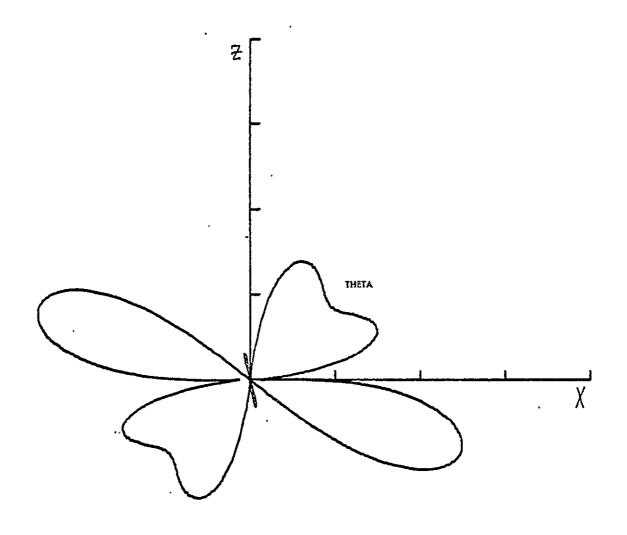


FIGURE B-175

FREQUENCY (MHZ) 3.93

V-ANT. LENGTH (FT) 450

MODE UNBALANCED

DB MAX + 2.9

DB MIN -17.1

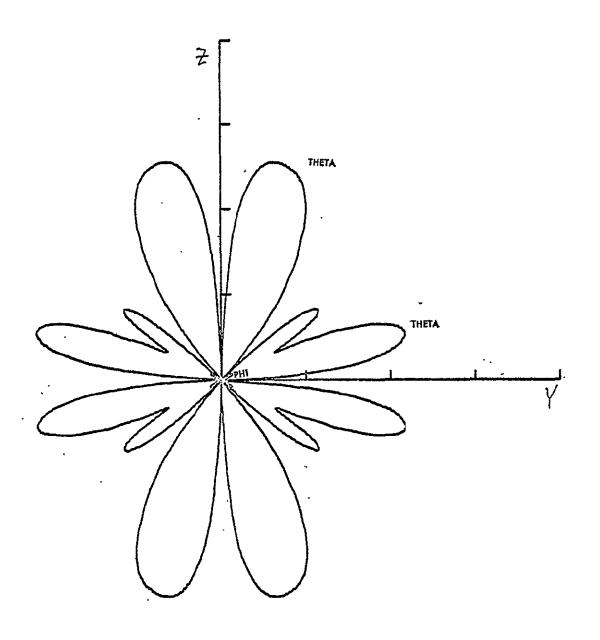


FIGURE B-176

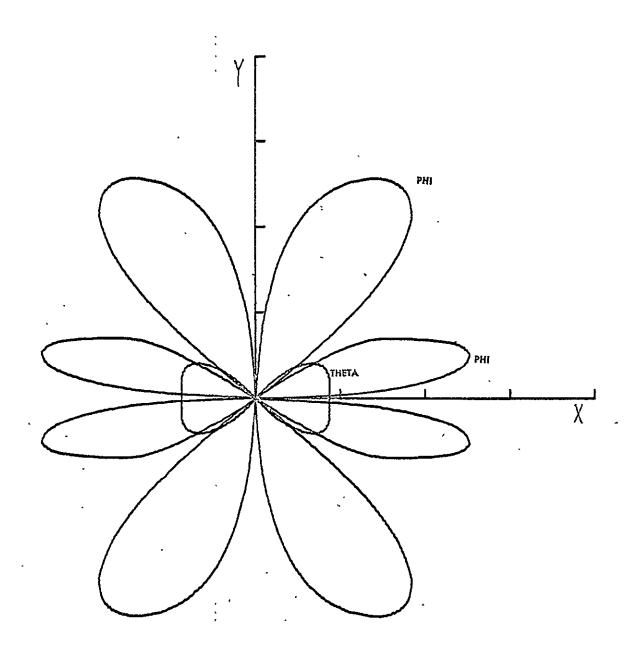
FREQUENCY (MHZ) 3,93

V-ANT. LENGTH (FT) 450

MODE UNBALANCED

DB MAX + 2.9

DB MIN - 17.1



FREQUENCY (MHZ) 3.93
Y-ANT. LENGTH (FT) 450
MODE UNBALANCEI
DB MAX + 2.9
DB MIN - 17.1

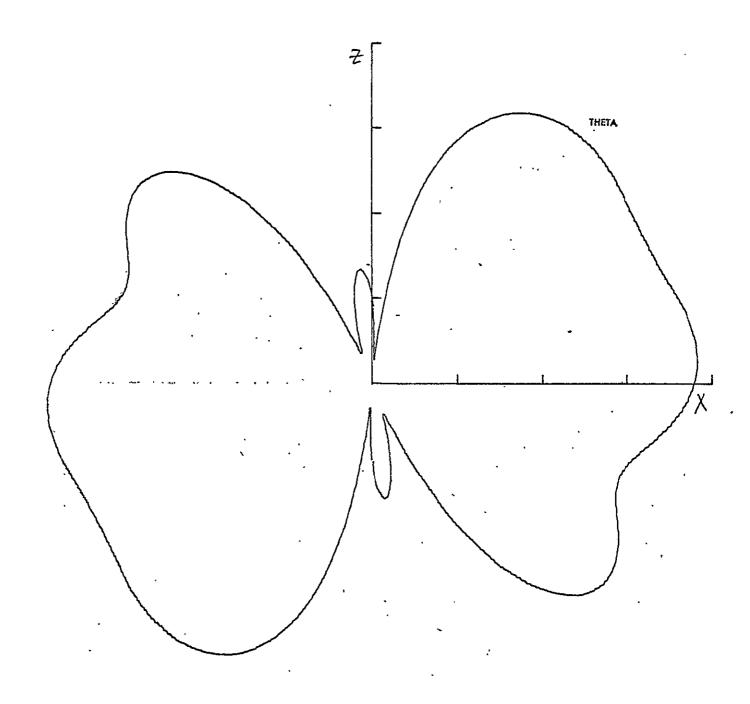


FIGURE B-178

FREQUENCY (MHZ) 4.70

V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX:+ 1.6

DB MIN - 18.4

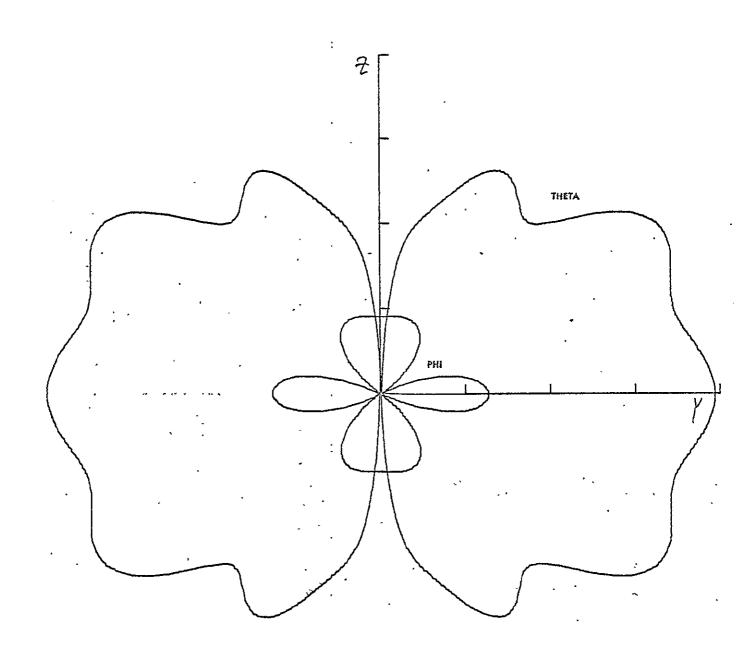


FIGURE B-179

FREQUENCY (MHZ) 4.70

V-ANT. LENGTH (FT) 450

MODE BAIANCED

DB MAX + 1.6

DB MIN -18.4

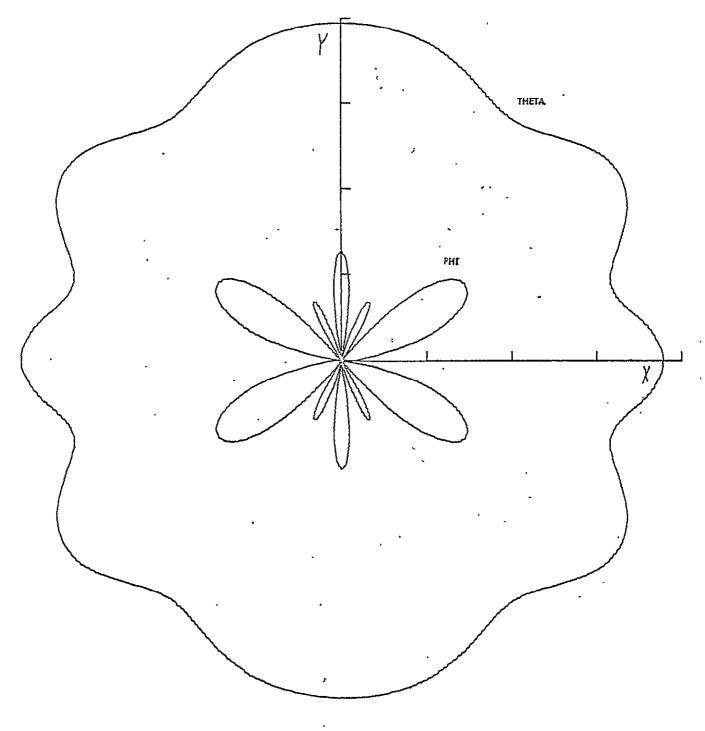


FIGURE 8-180

FREQUENCY (MHZ) 4.70
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 1.6
DB MIN - 18.4

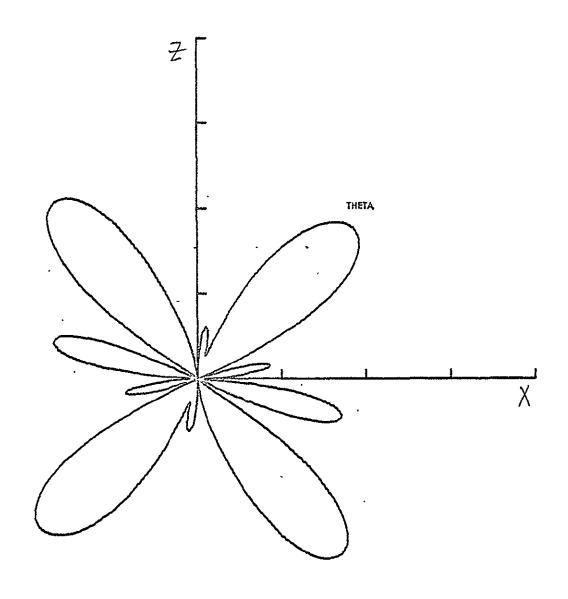


FIGURE B - 18 |

FREQUENCY (MHZ) 4.70

V-ANT. LENGTH (FT) 450

MODE UNBALANCEL

DB MAX + 1.6

DB MIN - 18.4

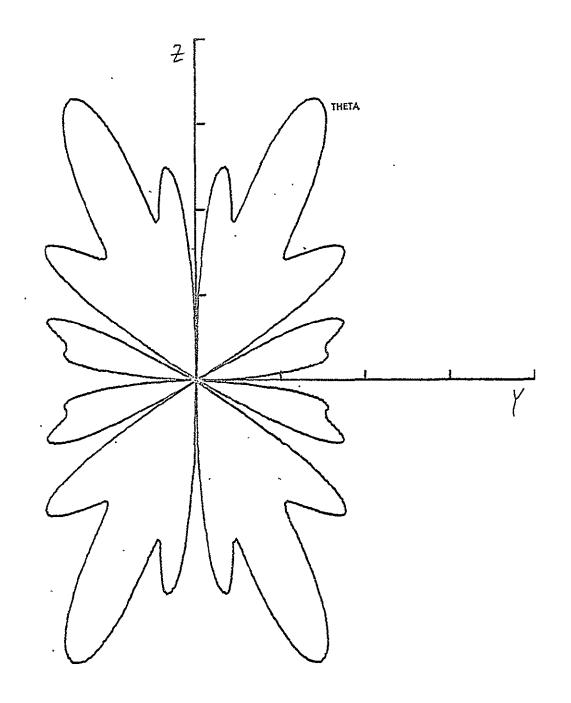


FIGURE B-182

FREQUENCY (MHZ) 4.70

V-ANT. LENGTH (FT) 450

MODE UNBALANCED

DB MAX + 1.6

DB MIN -18.4

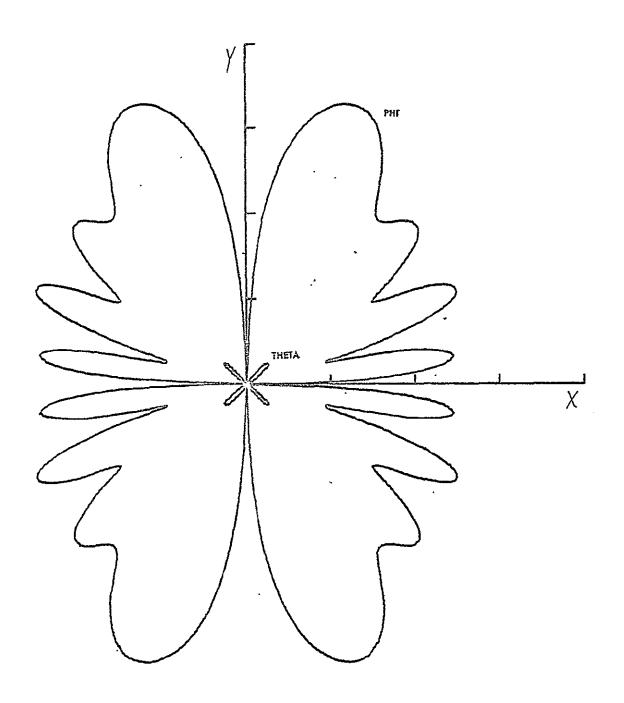


FIGURE B-183

FREQUENCY (MHZ) 4.70

V-ANT. LENGTH (FT) 450

MODE UNBALANCED

DB MAX + 1.6

DB MIN -18.4

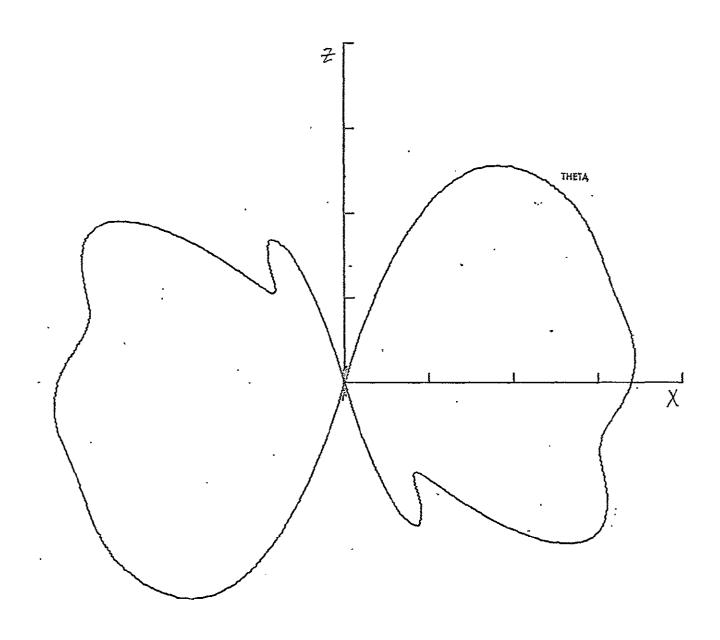


FIGURE B-184

FREQUENCY (MHZ) 6.55

V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX + 3.3

DB MIN -16.7

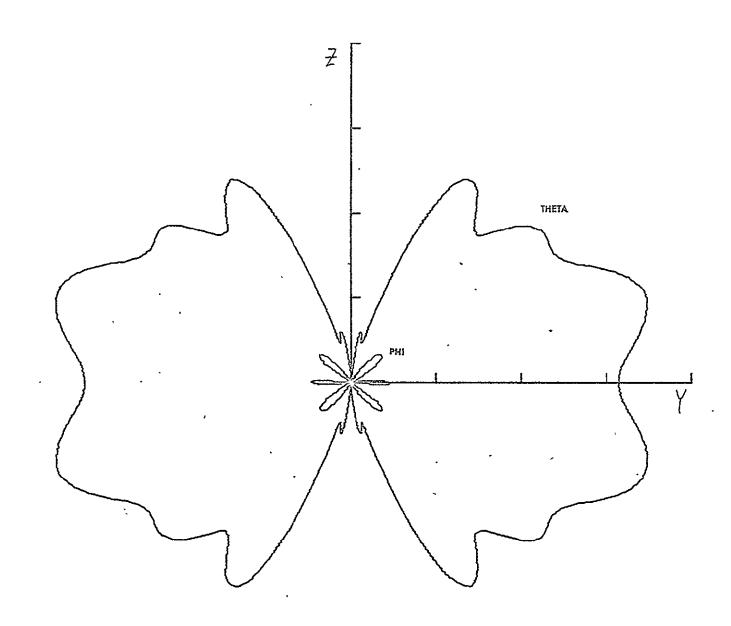


FIGURE B-185

FREQUENCY (MHZ) 6.55

V-ANT. LENGTH (FT)

MODE BALANCED

DB MAX + 3.3

DB MIN -16.7

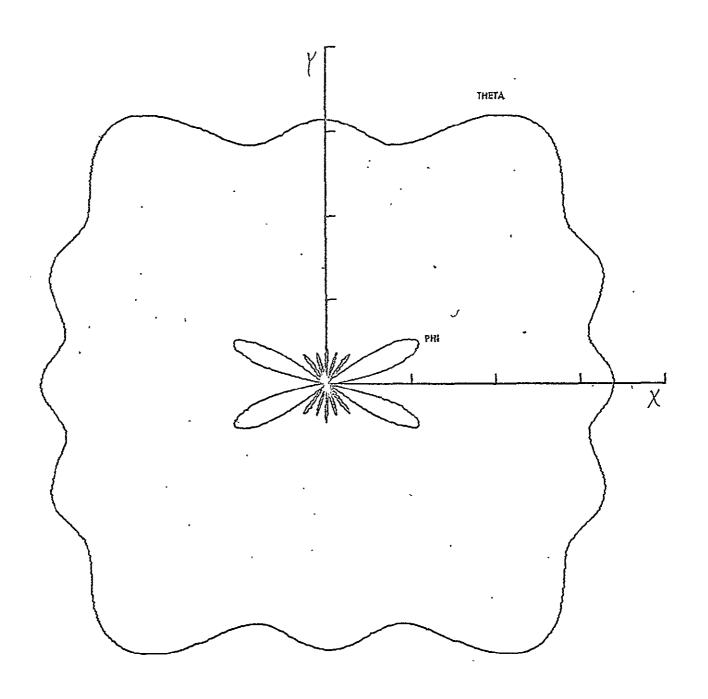


FIGURE B-186

FREQUENCY (MHZ) 6.55

V-ANT. LENGTH (FI) 450

MODE BALANCED

DB MAX + 3.3

DB MIN -16.7

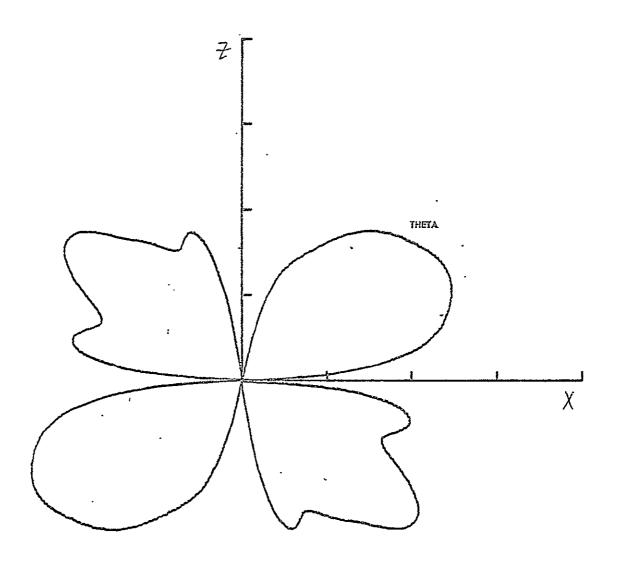


FIGURE B-187

FREQUENCY (MHZ) 6.55

V-ANT. LENGTH (FT) 450

MODE UNBALANCED

DB MAX + 3.3

DB MIN -16.7

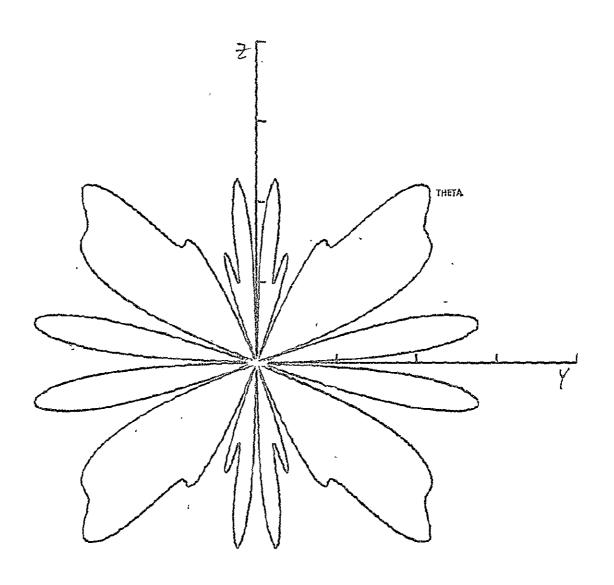


FIGURE B-188

FREQUENCY [MHZ) 6.55

V-ANT. LENGTH [FT] 450

MODE UNBALANCED

DE MAX + 3.3

DE MIN -16.7

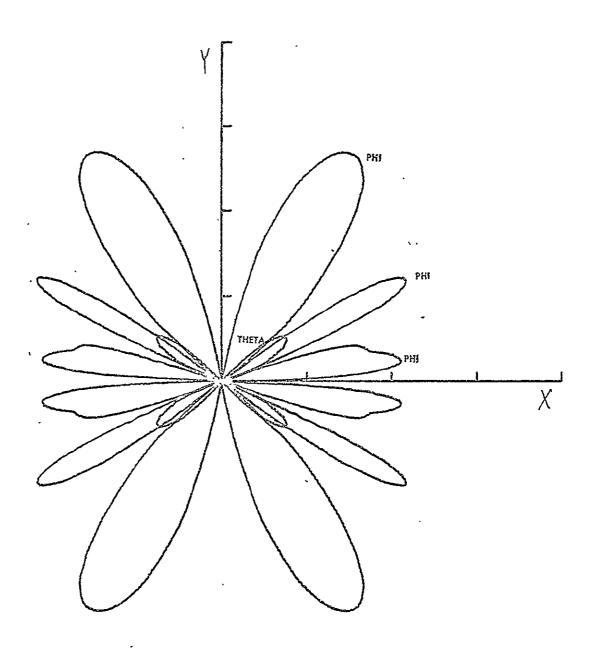


FIGURE B-189

FREQUENCY (MHZ) 6.55

V-ANT. LENGTH (FT) 450

MODE UNBALANCED

DB MAX " + 3.3

DB MIN -16.7

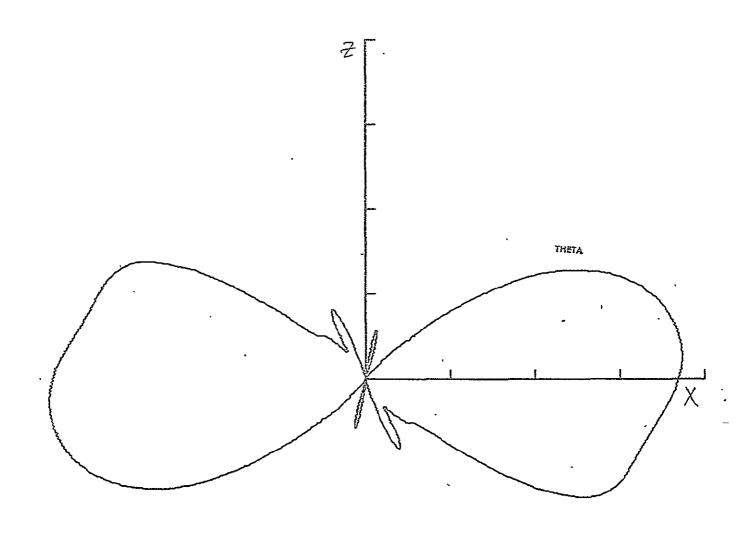


FIGURE B-190

FREQUENCY (MHZ) 9.18

V-ANT. LENGTH (FT) 450

MODE BALANCED

DB MAX + 4.9

DB MIN - 15.1

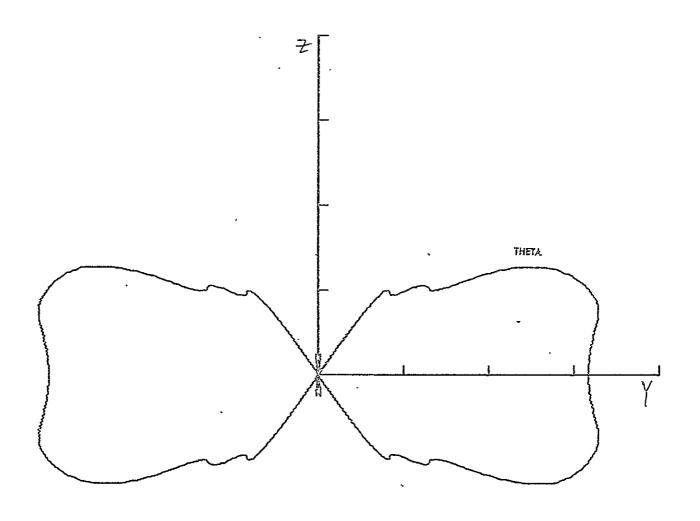
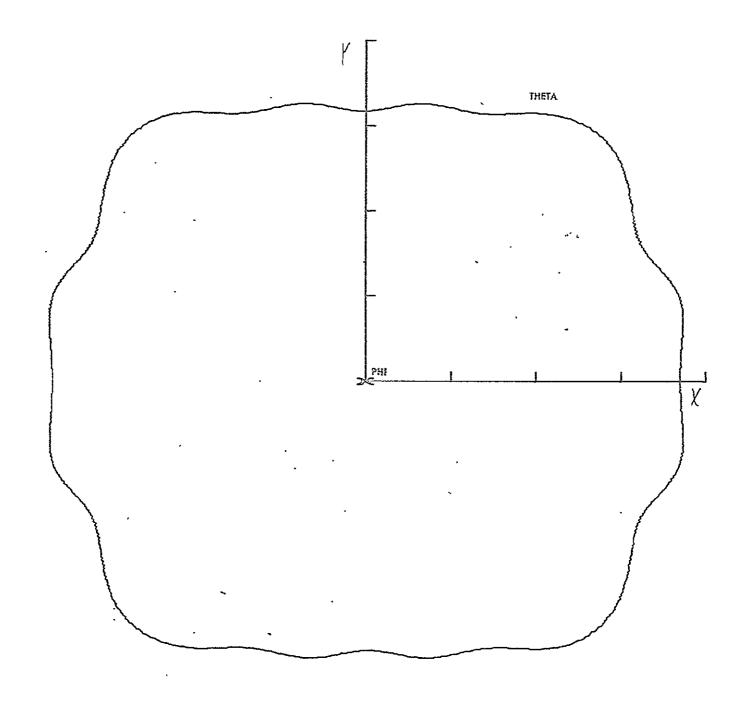


FIGURE B-191
FREQUENCY (MHZ) 9.18
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 4.9
DB MIN - 15.1



PEURE B-192
FREQUENCY [MHZ] 9.18
V-ANT. LENGTH (FT)
MODE BALANCED
BE MAX ++19
DB MAN -1511

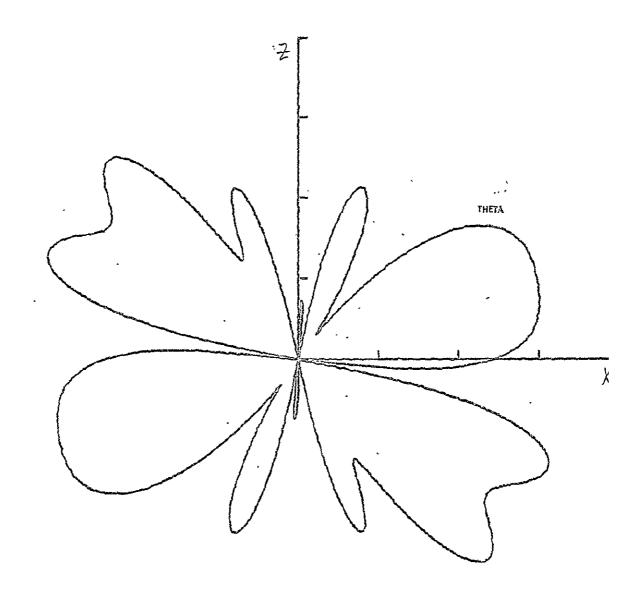


FIGURE B-193

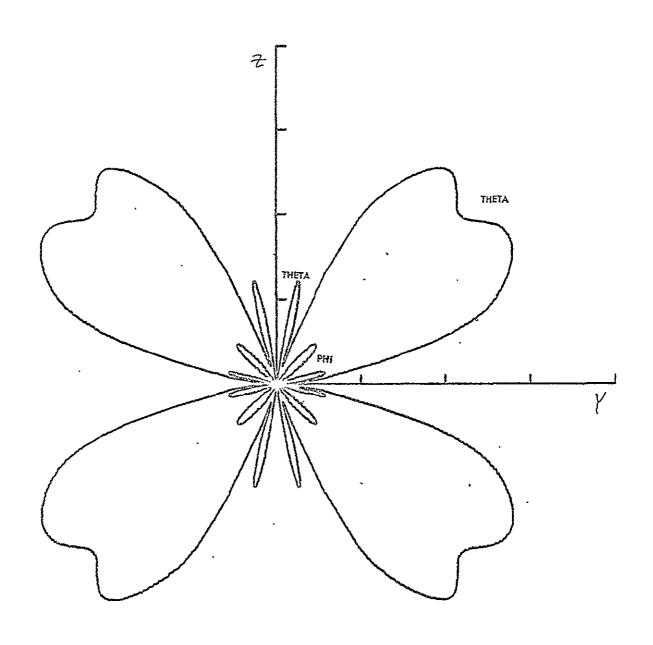
FREQUENCY (MHZ) 9.18

V-ANT. LENGTH [FT] 450

MODE UNBALANCEL

DB MAX + 4.9

DB MIN -15.1



FREQUENCY (MHZ) 9.18 V-ANT. LENGTH [FI] 450 MODE UNBALANCED 1 DB MAX + 4.9 DB MIN -15.1

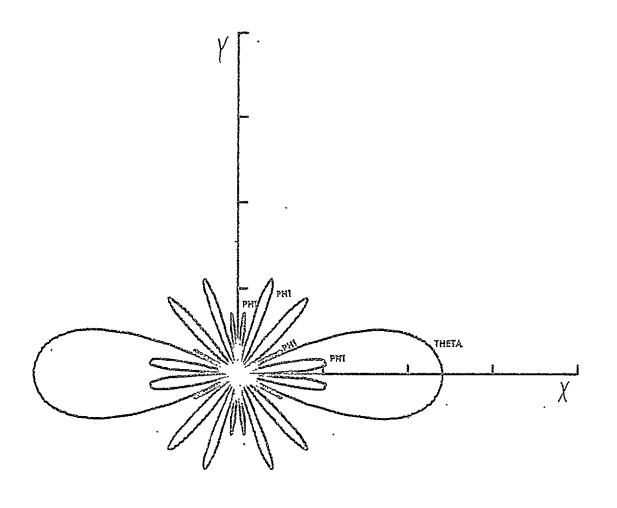


FIGURE B-195

FREQUENCY (MHZ) 9.18

V-ANT. LENGTH (FT) 450

MODE UNBALANCED

DB MAX + 4.9

DB MAY - 15.1

APPENDIX C

CURRENT DISTRIBUTIONS FOR DIPOLE ALONE ON SATELLITE

See Appendix A for discussion

NOTE: Wires 1 through 6 represent the dipole, and wire 7 the spacecraft capacitance.

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ا پ	3	4	0.00			2.0803 1.4601	1.7755	1.4556 7722.	88.4 88.2	88.3 88.1	88.2 88.0	172.538 189.967	-1.0 -1.6			•	
	3	5	0.00			.7842	.4079	.0000	88.0		~94.9	216.569	-2.0				•
			0.00			GAP 2			GAP 2			241.007					
	. 4	6 7	0.00		****	2.6893 . 2.4607	. 2 . 5571 2.2672	2.4426 <u>.</u> 2.0736		-91.4 -91.5							•
	6	8	0.00			2.0803	1.7755	1.4556		~91.7		165.528 172.538					
	. 6	. 9	0.00			1.4601	1.1243	.7722		91.9		189.967					
	6	10	0.00			.7842	.4079	.0000		-92.l	85.1	216.569		,			•
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	2		8.358	-371.756	•000060	.002689	0.0	00 0	.000	8.35	8 -371	.756	1000.000	-180.0		•	

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WIRE INT NO NO	WAVE- LENGTHS	WAVE- LENGTHS	WAVE- LENGTHS	AMP	AMP	АНР	DEG	.DEG	DEG	_ VOLTS	, DEG	-		-		
	0.0000	0.0000	0000	GAP 1			GAP , 1			241.046	1					
1 1	0.0000	0.0000	.0071	4.6065	4.4361	4.2834	86.0	85.9	85.8	217.417	3					
ž ž	0.0000	0.0000	.0284	4.3065	4.0322	3.7396	85.8	85.6	85.4	190.738	-1.B					
2 2 3 3	0.0000	0.0000	.0647	. 3.7484	3.2556	2.7067	4 ہ 85	. 85.2	85.0	226.398	3.3	-		•	.	-
3 4	.0.0000	0.0000	.1088	2.7138	2.1122	1.4621	85.0	84.8	84.6	271.967	~4.6					
3 5	0.0000	0.0000	.1529	1.4846	.7761	.0000	84.6	84.4	-99.3	322.547	-5.4					
- ,	0.0000	0.0000	.0000	GAP 2			GAP 2			. 241.046	-179.9					
4 6	0.0000	0.0000	0071	4.6065	4.4361	4.2834	~94.0	-94.1	-94.2	217.417	179.7					
5 7	0.0000	0.0000	0284	4.3065	4.0322	3.7396	-94.2	-94.4	-94.6	190.738	178.2					
. 6 . 8	0.0000	0.0000	0647	. 3.7484	. 3.2556	2.7067	-94.6	94.8	95.0	226.398	176.7					
6 9	0.0000	0.0000	1088	2.7138	2.1122	1.4621	-95.0	~ 95°2	-95.4	271.967	175.4		•			
6 10	0.0000	. 0.0000	1529	1.4846	.7761	.0000	-95.4	-95.6	80.7	322.547	174.6					
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WIRE NO		WAVE~	VAVE- LENGTHS	WAVE- LENGTHS	AMP	АМР	AMP	DĖG	DEG	DEG	VOLTS	DEG		M. N. KOMP. N 2K P	A 1000 JAN7161 J. A.
2	1 2	0.0000	0.0000 0.0000 0.3000	0000 .0071 .0284	GAP 1 •2678 •1769	•1930 •1497	.1483 .1296	GAP 1 90.0 90.0	90.0 90.0	90.0	120.615 80.232 15.889	.0		•	
	3 4 5	0.0000	0.0000	.0647 .1088 .1529	.1350 .0922 .0492	.1126 .0706 .0255	.0910 .0480	90.0 90.0 89.9	90.0 89.9 89.9	90.0 89.9	9.567 9.551 10.687	0 0 1			• • • • • • • • • • • • • • • • • • •
. 4 . 5	6 7	0.0000 0.0000 0.0000	0.0000 0.0000 0.0000	.0000 0071 0284	GAP 2 .2678 .1769	•1930 •1497	•1483 •1296	GAP 2 90.0 90.0	90.0	90.0	120.615 80.232 15.889	.0 .0			
6 6	8 9 10	0.0000 0.0000 0.0000	0.0000 0.0000 0.0000	0647 1088 1529	.1350 .0922 .0492	.1126 .0706 .0255	.0910 .0482 .0000	90.0 90.0 89.9	90.0 89.9 89.9	90.0 89.9 +90.5	9.567 9.551 10.687	.0 0 1			
7	11 .	0.0000	0000 .0049	0.0000	GAP 3 .2678	.1332	•0000	GAP 3 ~90.0	~90.0	~89 . 9	263.040 260.593	180.0			
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. ф бар No		INPUT SIST. OHMS	INPUT REACT.	INPUT CONDUCT.	INPUT SUSCEPT. MHOS	LOAD RESIST	,RE	LOAD ACT. OHMS	GA RESIST	•R	GAP EACT. OHMS	GAP VOL	TAGE	••	
1 2		.151 -37	734.273 734.273	.000000 .000000	.000268 .000268	0.000) 0	.000	15	_	4.273	1000.000	0.0		•
		•		F	INPUT POWER RADIATED PO VIPE LOSS		• 0	22 WATTS 22 WATTS 00 WATTS	•						
	r			ı	NETWORK LOS		0.0	00 WATTS				•• • • •		1 H MAX 7	** * * *

0.0000

.0069

MAXIMUM RELATIVE ASYMMETRY IN THE ANTENNA ADMITTANCE MATRIX IS EXCITATION MODE 1 GAP SOURCES MICRO . PICO HENRY FARAD EMF DEGREES 2 1000.0000 180.00 -0.0000 -0.0000 INFINITY SERIES..... SERIES.... SERIES CURRENT DISTRIBUTION NORMAL ELECTRIC FIELD * RADIUS COORDINATES AMPLITUDE PHASE WAVE- . WAVE-AMP . . . AMP . . . DEG _ DEG _ VOLTS .DEG _ ...___. WIPE INT . WAVE→ LENGTHS LENGTHS LENGTHS / ._ 245.502 -.0000 GAP 1 GAP 1 24.9575 24.8500 -10.9 -11.4 -11.8 204.171 -26.5 . GAP 1 0.0000 0.0000 0.0000 0.0000 24.8439 24.3238 23.4194 -11.7 -12.3 -12.9 360.338 -83.7 0.0000 0.0000 .0399 792.750 ... 23.4221 21.2901 18.3365 -12.8 -13.5 -14.1 -98.4 0.0000 0.0000 .0908 -14.1 -14.6 -15.0 1245.828 -102.8 18.3653 14.6710 10.3451 0.0000 0.0000 .1527 10.5018 5.5496 .0000 -15.0 -15.4 156.6 1630.639 -105.0 0.0000 0.0000 .2146 245.502 179.7 0.0000 0.0000 .0000 GAP 2 GAP 2 169.1 168.6 168.2 204.171 153.5 24.9616 24.9575 24.8500 0.0000 0.0000 -.0100 24.8439 24.3238 23.4194 168.3 167.7 167.1 360.338 0.0000 0.0000 -.0399 18.3365 167.2 166.5 165.9 792.750 23.4221 . 21.2901 -.0908 . 0.0000 .0.0000 165.9 165.4 165.0 1245.828 165.0 164.6 -23.4 1630.639 18.3653 14.6710 10.3451 0.0000 0.0000 -.1527 10.5018 5.5496 .0000 0.0000 -.2146 0.0000 . GAP 3 .000 113.1 0.0000 0.0000 0.0000 GAP 3

.0000 -173.6 -178.0 -18.3

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	41 # 1 7 7 # 44 *			IMPEDANCE DA	ιΤΑΑΤΑ					
. GAP NO	INPUT RESIST. OHMS	INPUT INPUT REACT. CONDUCTA OHMS MHOS	SUSCEPT.	LOAD _ RESIST. OHMS	LOAD REACT. OHMS	GAP RESIST. OHMS	GAP REACT。 OHMS	GAP_VOL VOLT		NAMES OF THE PARTY
i	39.345 39.345		004701 004701	0.000	0.000	39.345 39.345	7.545 7.545	1000.000		
			WIRE LOSS NETWORK LOSS	[R_=490 = .	TTAW 000.	S				
	, , , , , , , , , , , , , , , , , , , ,		EXC	вдой моітаті	: a:					
. C. 8			A A. A	GAP SOURCES		\$	***	5		
*** **			FEMF	OHM_	MICROF	PICO	·	-		
		1 1000.000	-0.00 -0.00	-0.0000 -0	0.0000 INFI 0.0000 INFI	NITY . TIN	SERIES SERIES	vers	- ·· · ·· -	
w <u>e</u>					,,	,				
	4 mm 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	555/1521111125	، سه د پنه مغرب پيره د			TION	NORMAL FIELD *	ELECTRIC RADIUS		
	x	·	Z	MPLITUDE		PHÁSE	and restricted that the terminal	v 1-1-1		20 20 44 440 Mind Mind III
WIRE I NO	NT WAVE- NO LENGTHS	WAVE- WAVE LENGTHS LENGTE	AMP	AMP	AMP , , DEG	DEG	DEGVOLT	S_ DEG (. ,
1 2 3 3 3 3 3	1 0.0000 2 0.0000 3 0.0000 4 0.0000 5 0.0000 0.0000	0.0000 .01 0.0000 .03 0.0000 .09 0.0000 .15 0.0000 .21	.3832 .2618 .8 .2137 .7 .1575 .0880	.2297 .2 18601 .1239 .0 .0462 .0	GAP 1 2209 90.0 2059 90.0 1557 89.9 0863 89.7 0000 89.6 GAP 2	90.0 8 89.9 8 89.8 8 89.7 8 89.5 9	118.24 9.9 77.67 9.9 13.40 9.7 9.01 9.6 11.06 2.1 13.66 118.24	4 .0 3 .3 1 .2 6 -1 0 -4		

06	/20/70	•												PAGE 9
		,	, ··· · · · · · · · · · · · · · · · · ·	Ž		MPLITUDĖ .	**		PHASE				_ ,	
WIRE NO	INT NO	VAVE- LENGTHS		· WAVE- LENGTHS	AMP .	AMP	. AMP	DEG	DEG	. DEG.	_ VOLTS	DEG		
· 4 5 6	7	0.0000 0.0000 0.0000	0.0000	0100 0399 0908	.3832. .2618 .2137	.2297	2059	90.0 90.0 99.9	90.0 . 89.9 89.8	89.9 89.7	77.674 13.403 9.011	2		
6 6	-	0.0000 0.0000 0.0000	0.0000	2146 0.0000	.1575 .0880 GAP 3	.0462	0000 GAF	39.7 39.6 2 3	89.7 89.5	-92.1	11.066 13.660 266.266 265.689	4 180.0		~
. '	11	0.0000	J. 20009	. 0.0000	,,,,,	81910 L	•	20.00.	, JUAV ,		., 2006007	,0000		
		~ .		, arangereA.			/ x x 300 500 x x				<u></u>			
		-		v 44.00 l		IMPEDANCE I	DATA			w w > 1 ~ ~ ~				
. GAP NO		INPUT SIST. OHMS	INPUT REACT. OHMS	INPUT CONDUCT. MHOS	. INPUT . SUSCEPT. MHOS	. LOAD. RESIST. OHMS	REACT	•	. GAP RESIST. OHMS	RE	GAP ACT. OHMS		LTAGE	m myr
1 2		.746 -2	2609.918 2609.918	.000000	.000383	0.000	0.000			-2609 -2609		1000.000		., .
/ *		•	- 4		INPUT POWER RADIATED POWE WIRE LOSS NETWORK LOSS RADIATION EFF	=	.219 \ .219 \ .000 \ 0.000 \ 100.00 PEF	AATTS. MATTS MATTS		- ,				
	. •	, 		1841M W 95 W P 1 37						, , ,				
. •			**	**			¥	,	*	. лын п	# % T##7#F Z [*]		en, a 2242 eu	
. 4		4 F43-844 #F70			FRE	EQUENCY.= .	4.7000 h	۲¢				c 1 674- v-16 44		
					~	، منه دمه ۱۹۰۵ ۱۹۹۹ این _{این} منه سه ایند این	ng 150 ang 140 ang 140 ang 160 a			•				
*	- ** *	, , , , , , , , , , , , , , , , , , , ,				NO GROUND	PRESENT	***************************************		·				
	М	AXIMUM RE	ELATIVE ASY	MMETRY IN	THE ANTENNA /	ADMITTANCE I	MATRIX IS	0	PER CE	NT FOR	GAPS _ 2	AND 1		
	-				Ех	CITATION MO	DE 1	•	A 4 5 30 30	•			** ** * ** **	
		F F E FFT											, ,,	

GAP SOURCES

						_		_					20/70	
•					RAD		HENR'	мно	DEGREES	EMF VOLT	GΛÞ.	, ,		
· · ·	· · ·		ERIES			îNFIN INFIN		-0.0000	-0.00 180.00	1000.0000			-	
	•				-	,				•	•			
			NORMAL E		ION	 ISTRIBUT	JRRENT D	,		TES	COORDINA	1 400 to or 1	* *	
	-,	•			PHASE	*****		AMPLITUDE		Ż	Υ	х х	• • • /	• •
14 mg - 1977 FEE A Miles m or A 14 4 4		- DEG	VOLTS	DEG	DEG	DEG	AMP	AMP	AMP	WAVE-	WAVE-	WAVE-		WIRE
		-2.9	241.659 181.333	-66.7	 +65.8	GAP 1 -64.6	6.0609	5.8955 °	GAP 1 5.6583	0000 .0119	0.0000	0.0000	1	1
		-147.8	52.727 129.223 280.201	-70.7	-67.7 -69.7 -71.4	-66.5 -68.6 -70.6	.6.1559_ 5.1726 3.0263	6.1693 5.8228 4.2273	6.0252 6.1443 5.1763	.0478 .1086 .1827	0.0000	0.0000	2 · 3	_2 3 3
			399.886 241.659 181.333	-75.7	-72.6 114.2	-72.0 GAP 2 115.4	6.0609	1.6369 5.8955	3.0716 GAP 2 5.6583	.2567 .0000 0119	0.0000	0.0000	5	, 3
e na gar at that k is a time and the first of k time.		142.2 32.2 21.4	52.727 129.223 280.201	111.4 109.3	112.3 110.3 108.6	113.5	6.1559 5.1726 3.0263	6.1693 5.8228 4.2273	6.0252 6.1443 5.1763	0478 1086	0.0000	0.0000	6 7 8	5
		18.0 99.4 94.0	399.886 .000	104.3	107.4	108.0 GAP 3	.0000	1.6369	3.0716 GAP 3	1827 2567 0.0000	0.0000 0.0000 0.0000	0.0000 0.0000 0.0000	10	6
		9440		112•1	-178.6	-176.0	.0000	.0000	.0000	0.0000	.0082	0.0000	11	7
		·				**-								
					•		E DATA	IMPEDANC						•

-GAP NO	INPUT RESIST.	INPUT	INPUT	INPUT SUSCEPT	LOAD RESIST.	LOAD REACT.	GAP RESIST.	GAP REACT.	GAP VOLTAGE	
NO .	OHMS	OHMS	MHOS	мноѕ	OHIIS	OHIIS	ончѕ	OHMS	VOLT DEGRE	
1 2	75.729 75.729	159.684 159.684	.002425 .002425	005113	0.000	0.000	- 75.729 75.729	. 159.684 159.684	1000.000 -18	0.0

INPUT POWER = 4849.179 WATTS
RADIATED POWER = 4849.179 WATTS
WIRE LOSS = .0000 WATTS
NETWORK LOSS = 0.000 WATTS
RADIATION EFFICIENCY = 100.00 PER CENT

	•				_	-		•	,						,				3617, 1243, 74
-	**			• ••	·				.E	XCITATION I	40DE 2	·	·	······································		,		, 1475	هند مده مده ۱۳۰۰ سر داد بدر سیوسیده از ۱۳۳۵ سال
,-	-, <i>-</i>		* * **********************************				** <u></u>			-			- 		·			Yeston hardy Aldino war	pager 5 A 5 Aut II C Steelly , 4 Automated
		·			•					GAP _SOUP	RCES		·				ه د با خات ، خسنجه خورجو هو یک کا	-	. بورون و ده د سفف
						_							•					•	
,	******		······································	.,		G	AP	VOLT	DEGREES	OHM	HENR		PICO ARAD		•		······································		ا بد مند فرد بو استجداری بور بوینزواد ماک کشتیده . پدر
				·····	·		_1	1000.0000_	ó.00_		0.0000	INEI	NITY	S	ERIES	· .			
				r	•	•	۷.	1000.0000	-0.00	-0.0000	-0.0000	. INFII	NITY ;	٠ S	ERIES '		,		•
	_	,		,	,					**************************************	**************************************				<i>t !</i>	, ,			ساطانية و جديد ويونونونونون الله (الدائن) الماطان (الدائن)
				. ,	-,,	COORD	•	res ;	1 .	· Cu	JRRENT DI		TION		NORMAL FIELD *	ELECTRIC RADIUS	• • •		N
					X		 Y	Z	· · · · · · · · · · · · · · · · · · ·	AMPLITUDE	-	· · · · · · · · · · · · · · · · · · ·	PHASE						
	"Wj							WAVE+	AMP	AMP	AMP	DEG	. '		YOLT	, ; SDEG		,	
C-1		NU	NO.				-	LENGTHS.	٠. ٠			1 11 4	, <u>) * +</u> , (-	1				
'n]]	1	0.0 0.0 . 0.0	0000	0.00	00		•4681	.3491	.2817	.GAP . 1:	89.9	89.8	115.53 74.62	7 .1			ر د در دو در کیگار پر دادستان
-		3, . 3	3 4	0.0) 000	0.00	00	1086 1827	•3317 2901_ •2300	.3021 .2632 .1852	.2804 2276 .1312	89.8 .89.6 .89.3			10.29 8.14	18_		 	بسب وجود مدود مدود مرسد
		ž	5	0.0	000	0.00	00	•2567 •0000	.1338 GAP 2_	.0709	.0000	89.0 GAP 2		89.0 88.0	12.85 17.42 115.53	0 -1.0			
		4 5	6	0.0	000	0.00	00	0119 0478	•4681 •3317	.3491 .3021	.2817 .2804	89.9 89.8	89.9 89.7	89.8 89.6	74.62 10.29	7 .1		,	
		6 6	8 9		000.		00	1086_ 1827	.2901 .2300	.2632 .1852	2276 .1312	89.6_ 89.3	89.4 89.1		8.14	18		landanaer y , ,	
		6 	10	0.0	000	0.00	00	2567 0.0000_	.1338 	•0709 '	, 0000		88.8,4	1 88.0	17.42		or the t		
		7	11	0.0	000	.00	82	0.0000	•4681	•2345	•0000	-90.1	-90:1	-92.0	271.42	5 179.9	r r i - 1 1	•	4
				, , , , , , , , , , , , , , , , , , , ,			,	and the state of the state of				- 1 4		, ,	1	10 1	<u>, , , , , , , , , , , , , , , , , , , </u>		
	··	·				m## +x -											, 		. A VA DE CONTROL OF THE STATE OF THE STATE OF
										. IMPEDANCE	٠,	<u> </u>	₹ •					•	
,		NO	RE	INPUT SIST. OHMS		INPUT REACT. OHMS		INPUT CONDUCT. MHOS	INPUT SUSCEPT. MHOS.	LOAD RESIST.	''' REA	OAD ' ''	GAI ''RESIST	R R	GAP EACT.	GAP VO		******	
		1 2		2.050	-21	36.507 36.507		.000000	.000468 .000468	0.000	0.	000	2.050	-213		1000.000	0.0		

06/20/70			PAGE 12
	INPUT_POWER = .898_WAT RADIATED POWER = .898_WAT WIRE LOSS = .000 WAT	ITS	
	NETWORK LOSS = 0.000 WAT	rts	
	RADIATION EFFICIENCY = 100.00 PER C	CENT · .	·.
•			
	FREQUENCY = 6.5500 MC		
	NO GROUND PRESENT		•
MAXIMUM RELATIVE ASYMMETRY I	N THE ANTENNA ADMITTANCE MATRIX IS	•0 PER CENT FOR GAPS 2 AND 1	
	EXCITATION MODE 1		•
			7
G .	GAP SOURCES .		;
GAP E	MF EMF OHM MICRO . _T DEGREES HENRY	PICO FARAD	CONTROL OF THE BOOK PERSON PRODUCTION AND THE PERSON PROPERTY AND THE BOOK
1 1000.00 2 1000.00		INITY SERIES INITY SERIES	
,			a-random ar had arrays areas elements about the a
COORDINATES	CURRENT DISTRIB	UTION NORMAL ELECTRIC FIELD * RADIUS	
x y.	Z AMPLITUDE	PHASE	CANTE & MANUAL AND
WIRE INT WAVE- WAVE- WAVE NO NO LENGTHS LENGTHS LENGTH		G DEG DEG VOLTS DEG	
0.0000 0.0000000 1 1 0.0000 0.0000 .010 2 2 0.0000 0.0000 .060	56 1.0210 1.3380 1.6117 -50. 55 1.5612 1.9537 2.2450 -65.	5 -61.1 -66.6 198.7938 8 -71.5 -74.9 107.708 -4.2	
3 3 0.0000 0.0000 .15 3 4 0.0000 0.0000 .25 3 5 0.0000 0.0000 .35	*5		
4 6 0.0000 0.0000016 5 7 0.0000 0.0000066	66 1.0210 1.3380 1.6117 129.	2 241.443 179.7 5 118.9 113.4 198.793 179.2 2 108.5 105.1 107.708 175.8	

	06/	20/7	0									٠,			Þ	AGE	13
			.)	<u>Υ</u>	Z		AMPLITUDE		,	PHASE							
, 8	VIRE	INT				AMP	AMP	AHP	DEG_	DEG	DEG_	VOLTS	DEG				
	NO	NO	LENGTHS	S LENGTHS	L ENGTHS	•								•			
			0.0000				2.4510	2.4116 1.5785	105.3	102.1 98.7		26.500 78.615	_144.0 15.1				
•	. 6 . 6	9 10	0.0000	0.0000	3577	2.4081 1.6027	.8752	.0000	97.6	96.7	108.4	151.001	7.6				
	7	11	0.000.0 0.0000			GAP 3	.0000	.0000	_GAP3. -179.9	178.8	-39.5	.000 .000	90.1				
			•			•			:		•	•					
		•	*			•	*				·		,				
			· •	•						-							
		•		•		•	IMPEDANCE	DATA .			•				•		
	GAP		INPUT		INPUT	INPUT SUSCEPT.	LOAD RESIST.		LOAD ACT.	GA RESIST		GAP EACT.	GAP VOLT	AGE			,,
,	N0		ESIST. _ OHMS	REACT. OHMS	CONDUCT. MHOS	MHOS	OHMS	RE.	OHMS	HP	{S			EGREES		.,	
	1 2	. 6	22.761	755.877 755.877	•000649 •000649	000788 000788	0.000	0	.000	622.76	51 75 51 75	5.877 5.877	1000.000	0.0 -180.0			
		•							,					,			
		,				NPUT, POWER		1298.5	26 WATTS								
ဂ္					R W	IRE LOSS	WER =	.0	26 WALLS 00 WATTS	·		•					
Ė					N	ETWORK LOS	S = FFICIENCY =	0.0	00 WATTS PER CEN	;							
. :					·												
			· ,	, .	-	, , E	XCITATION M	ODE 2			, , ,		1	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		
	·	·*· - • • • •	سِسے ماریا، داد. •						,				,			,	
•			:						•		•	, , , , , , , , , , , , , , , , , , , ,		. <i>.</i>			
							GAP SOUR	CES			,	•	•				
		· ·-		, GAP	ÉMF	EMF	OHM	MICR) . P	ico	,						
				, GAP	VOLT	DEGREES	Une	HENR		RAD		,					
			*		1000.0000	-0.00 -0.00	-0.0000 -0.0000		0 INFIN			ERIES ERIES	•	•			******
414 727 1								عامدا بيد سرا		,		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		4			
			•				-		•		 		<u></u>				
	-			COORDIN	ATES	ŕ	cu	RRENT D	ISTRIBUT	ION		NORMAL EL	_ECTRIC				•

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		•		•			- •	_								
			<u>, x</u>	Y	Z	•••	AMPLITUDE	,	,	PHASE			: -	a .		
	WIRE.	INT	WAVE-	WAVE-	WAVE-	AMP	AMP	AMP	DEG_	DEG	DĘG	VOLTS	DEG			
	NO	NO	LENGTHS .	LENGTHS	LENGTHS	4	,	,		,		, ,	**	,	- ,	
	• •		0.0000	0.0000	0000	GAP 1			GAP 1			94.420	2.4			
	 1	·····	0.0000	0.0000	.0166	.7555	.6306	-5848	88.6	87.6	86.5	49.593	5.7			
- '	• •	÷	0.0000	0.0000	.0665	.6653	.7312	.7898	86.8	\85.4	84.4	18.519	161.8		•	•
•	~	~			•1514	.8058	8597	8341	84.4	83.3	82.5	3.704.	129.4			
<u>_</u>	ــ.٤.		0.0000	0.0000						81.8	81.2	27.609	-5.2			
	3	4	0.0000	0.0000	-2545	-8394	•7314	•5467	82.5			52.498	-8.8			
	3	5	0.0000	0.0000	.3577	•5572	. 3047	•0000	81.2	80.7	87.5					
		٠.	0.0000	0.0000	.0000	GAP 2			_GAP_, 2_			94.420_	2 <u>.• 4</u>			
	4	. 6	0.0000	0.0000	0166	•7555	.6306	•5848	88.6	87.6	86.5	49,593	5.7			
		7	0.0000	0.0000	0665	.6653	.7312	.7898	86.8	85.4	84.4	18.519	161.8	•	-	
	; 🦻	. (0,0000	0.0000	1514	.8058	•8597	.8341	84.4	83.3	82.5	3.704	129.4		•	
		, ö			- <u>.2545</u>	-8394	7314	5467 ⁻	82.5	81.8	81.2	27.609	-5.2	•		
	6	9	. 0.0000	0.0000				-		80.7	87.5	52.498	-8.8		7	
٠ ,	, 6	10	0.0000	0.0000	3577	.5572	.3047	.0000	81.2	00.1	01.5	298.447		•		
		<u> </u>	0.0000	0000	0,•0000	GAP , 3			_GAP,3_				—			
	7	. 11	0.0000	.0115	0.0000	•7555	•3869	•0000	-91.4	-91.6	79.6	314.509	118.0			
		1	•		•		•	•		•				•		
					,		,							•	· •	

· IMPEDANCE DATA

	GAP	INPUT	INPUT	INPUT	INPUT	LOAD	, LOAD	GAP	GAP	GAP VOLTAGE	
J.	NO	RESIST.	REACT.	CONDUCT.	SUSCEPT.	RESIST.	REACT.	RESIST.	REACT.	VOLT DEGREES	
1 A		онмѕ]	OHMS	MHOS	MHOS	` OHM2	กนน์ว	W. Okua?		VOLT DEGREES	
	1	32-612	-1323.209	.000019	.000755	0.000	0.000	32,612	-1323.209	1000.000 0.0	
J. L.	2	32.612.	1323.209	000019	000755	0.000	0.000	32,612_	1323.209	1000.0000.0_	······································
						•		•			

FREQUENCY = 9.1800 MC

NO GROUND PRESENT

MAXIMUM RELATIVE ASYMMETRY IN THE ANTENNA ADMITTANCE MATRIX IS .0 PER CENT FOR GAPS 2 AND 1

NO.

RESIST.

163.354

163.354

OHMS

REACT.

-557.734

-557.734

OHMS

CONDUCT.

.000484

.000484

SUSCEPT.

.001651

.001651

RESIST.

. OHMS

0.000

0.000

RESIST.

163.354

163.354

REACT.

____ VOLT DEGREES

1000.000 -180.0

1000.000

__ OHMS

-557.734

-557.734

REACT.

.. OHMS

0.000

0.000

EXCITATION MODE 1 **DEGREES** 1_1000.0000 -0.0000___-0.0000__INFINITY 2 1000.0000 -0.0000 -0.0000 INFINITY SERIES COORDINATES NORMAL ..ELECTRIC FIELD * RADIUS AMPLITUDE _WIRE INT ... WAVE- _ . WAVE- _ . WAVE- _ AMP_ _ AMP_ _ DEG _ DEG _ DEG _ VOLTS _ DEG _ ... LENGTHS LENGTHS LENGTHS _GAP .1. 0.0000 ... 0.0000 __ -+0000 .0233 0.0000 0.0000 1.7207 73.7 66.3 51.8 216.817 1.1909 .7590 .0933 0.0000 0.0000 .8243 .4670 1.0055 55.2 -19.0 -66.7 166.424 ..2122 __1.8816 ___ 2.4397 ___ -66.0 ___-80.6 __-85.2 __ _0.0000 _ ... 0.0000 .. •9767 106.099 ___ -7.2 0.0000 0.0000 .3568 2.4334 2.5019 2.0663 -85.1 -87.5 -89.1 27.200 -154.4 0.0000 0.0000 .5013 1.2118 .0000 2.1057 -89.0 -90.1 143.992 -179.0 0.0000 0.0000 . .0000 .GAP 2. GAP 2 241.644 _ 179.7 -.0233 .7590 0.0000 0.0000 1.7207 1.1909 -106.3 -113.7/-128.2 216.817 179.2 0.0000 0.0000 -.0933 .8243 .4670 1.0055 -124.8 161.0 113.3 166.424 177.4 0.0000 1.8816___ 99.4___ 94.8 __106.099__172.8 2.4397___ 114.0 0.0000 0.0000 -.3568 2.4334 2.5019 2.0663 94.9 92.5 90.9 27.200 .0000 6 -10 0.0000 0.0000 -.5013 2.1057 1.2118 91.0 89.9 -94.1 143.992 0.0000 ___O.0000.___GAP .3 GAP 3...000__ 89.3 .0161 0.0000 .0000 .0000 .0000 177.5 176.5 IMPEDANCE DATA GAP INPUT INPUT INPUT INPUT LOAD LOAD GAP GAP GAP VOLTAGE

0.0000

.0161

0.0000

.7505

967.303_WATTS INPUT POWER RADIATED POWER = 967.303 WATTS WIRE LOSS .000 WATTS NETWORK LOSS 0.000 WATTS RADIATION EFFICIENCY = 100.00 PER CENT AVERAGE GAIN = .9189 PRODÜCED_BINARY_DECK_NO. EXCITATION MODE 2 GAP SOURCES EŅF _ __OHM ____ MICRO DEGREES FARAD , 1 1000.0000 -0.00 -0.0000 -0.0000 INFINITY 2 1000.0000 -0.00 -0.0000 -0.0000 INFINITY SERIES SERIES COORDINATES CURRENT DISTRIBUTION NORMAL ELECTRIC FIELD * RADIUS AMPLITUDE PHASE .WIRE INT. WAVE-__ WAVE-_AMP____DEG___DEG___VOLTS _DEG NO NO LENGTHS LENGTHS LENGTHS 0.0000 0.0000 ___-.0000 GAP 1 142.380 82.0 0.0000 0.0000 .0233 .7505 .4439 .2253 86.6 68.3 111.239 0.0000 0.0000 .0933 .3065 .1352 .3130 73.4 2.2 -56.0 58.181 0.0000 0.0000 .2122 .2988 .6091 .8029 -54.3 -69.5 -74.0 36.332 0.0000 0.0000 ·3568 .8005 .8297 .6884 -74.1 -76.5 -78.1 8.444 -141.2 0.0000 0.0000 .5013 .7008 4044 .0000 -78.2 -79.4 96.3 47.922 -168.2 0.0000 0.0000 . .0000 _GAP 2 GAP 2 142,380 0.0000 0.0000 -.0233 .7505 .4439 68.3 111.239 82.0 86.6 0.0000 0.0000 .3065 -.0933 .1352 .3130 73.4 2.2 -56.0 58.181 . 0.0000 0.0000 -.21222988 .60918029 _ .-54.3 _ -69.5 _ -74.0 _ _ 36,332 0.0000 0.0000 -.3568 .8005 .8297 .6884 -74.1 -76.5 -78.1 8.444 -141.2 0.0000 0.0000 -.5013 .7008 4044 .0000 -78.2 -79.4 96.3 47.922.-168.2 0.0000 0.0000 0.0000 GAP 3 ... GAP 3 235.769 177.9

.0000

-93.4 -94.0 111.2

223.096 176.6

.3637

.IMPEDANCE_OATA_

<u>-</u>		RESIST.	INPUT REACT. OHMS	CONDUCT. MHOS	SUSCEPT. MHOS	LOADRESIST.OHMS	LOAD REACT. OHMS	RESIST.	GAPGAP REACT. OHMS	GAP_VOLT	TAGE	
, , ,	; 1	77.973 77.973	-1330.205 -1330.205	.000044 .000044	.000749 .000749	0.000	0.000 0.000	77.973 77.973	-1330.205 -1330.205	1000.000	0.0	
٠.				•	INPUT POWER	= 'R =	87.831 WATTS 87.831 WATTS					
	· · ·				WIRE LOSS NETWORK LOSS	# •=	.000 WATTS 0.000 WATTS 100.00 PER CENT			,	,	

AVERAGE GAIN = .9953

PRODUCED BINARY DECK NO. 406

APPENDIX D

RADIATION PATTERNS FOR DIPOLE ALONE ON SATELLITE

Pattern in a single principal plane is sufficient. See Appendix B for further discussion.

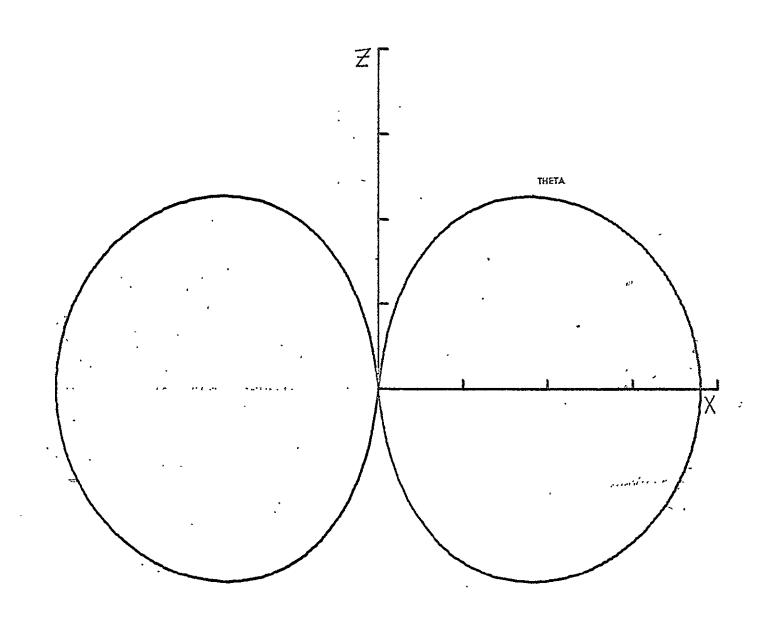


FIGURE D- |

FREQUENCY (MHZ) .202-2.20

V-ANT. LENGTH [FT] DI POLE ALONE

MODE BALANCED

DB MAX +2.7

DB MIN -17.3

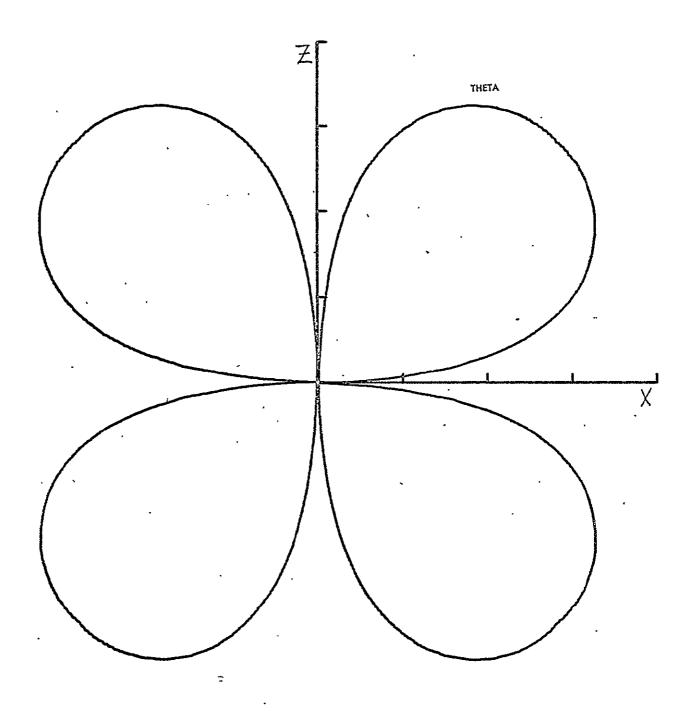
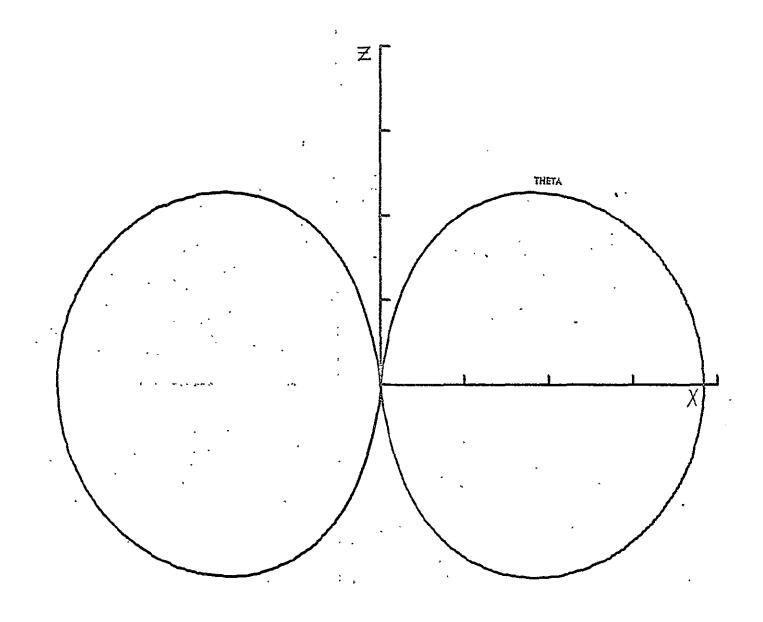


FIGURE D-2

FREQUENCY (MHZ) .202-2.20 V-ANT. LENGTH (FT) DIPOLE ALONE MODE "NBALANCED" DB MAX +2.7 DB MIN -17.3



D-3 FIGURE FREQUENCY [MHZ] 2.80 V-ANT. LENGTH [FT] DIPOLE ALONE MODE BALANCED DB MAX +2.5 DB MIN -17.5

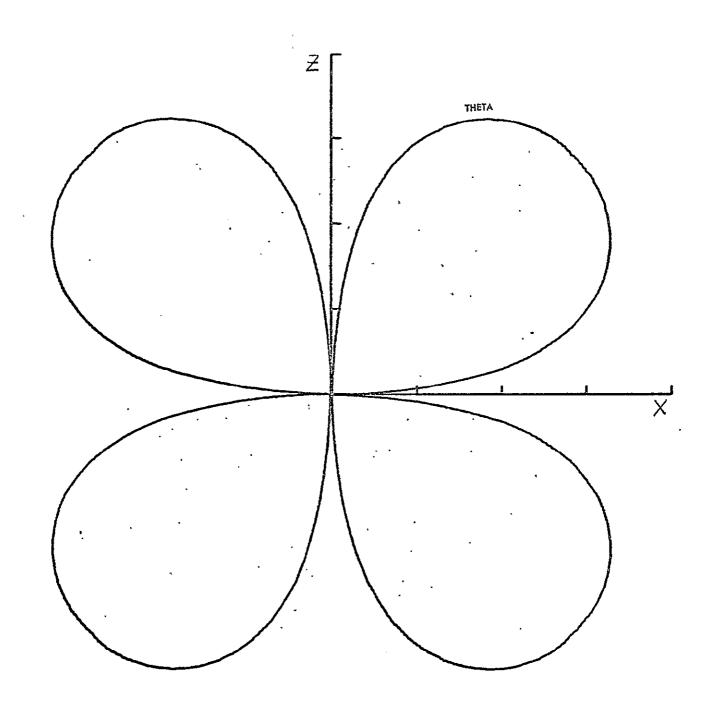


FIGURE D-4

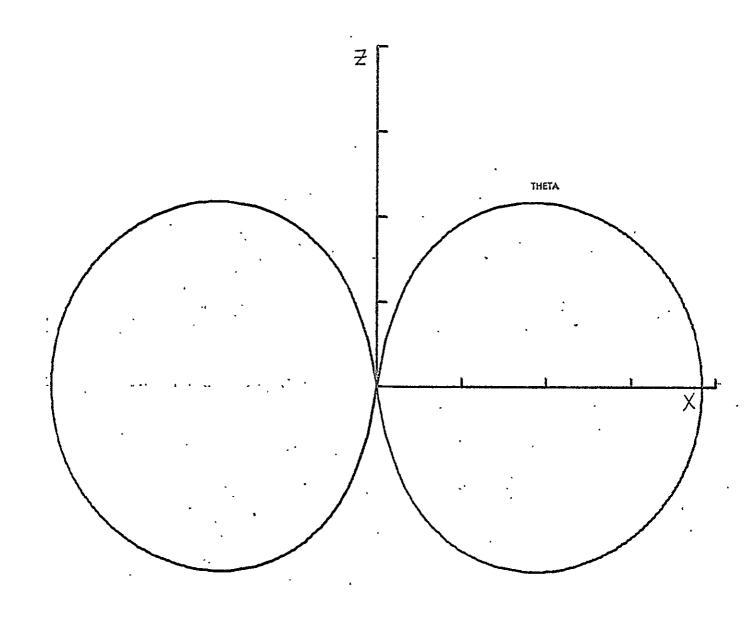
FREQUENCY (MHZ) 2.80

V-ANT. LENGTH (FT) DIPOLE ALONE

MODE UNBALANCEB

DB MAX +2.5

DB MIN -17.5



FREQUENCY (MHZ) 3.93

FREQUENCY (MHZ) 3.93
V-ANT. LENGTH (FT) DIPOLE ALONE
MODE BALANCED
DB MAX +2.7
DB MIN -17.3

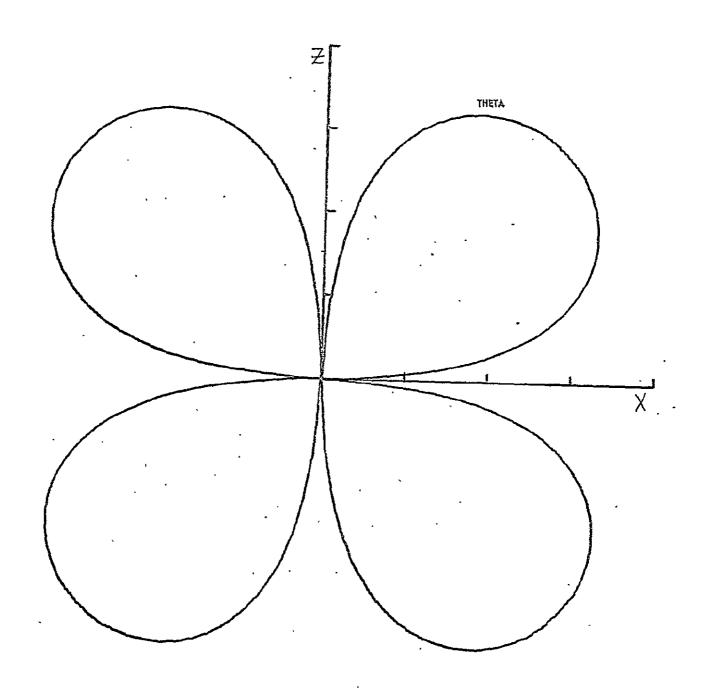


FIGURE D-6

FREQUENCY (MHZ) 3.93
V-ANT. LENGTH (FT) DIPOLE ALONE
MODE UNBALANCED
DB MAX +2.7
DB MIN -17.3

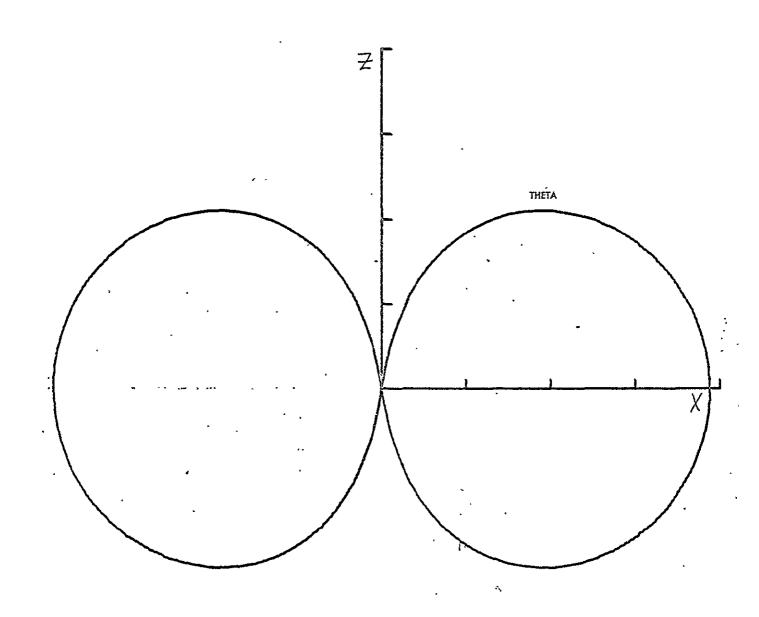


FIGURE D-7

FREQUENCY (MHZ) 4.70

V-ANT. LENGTH (FT) DIPOLE ALONE

MODE BALANCED

DB MAX + 2.7

DB MIN -17.3

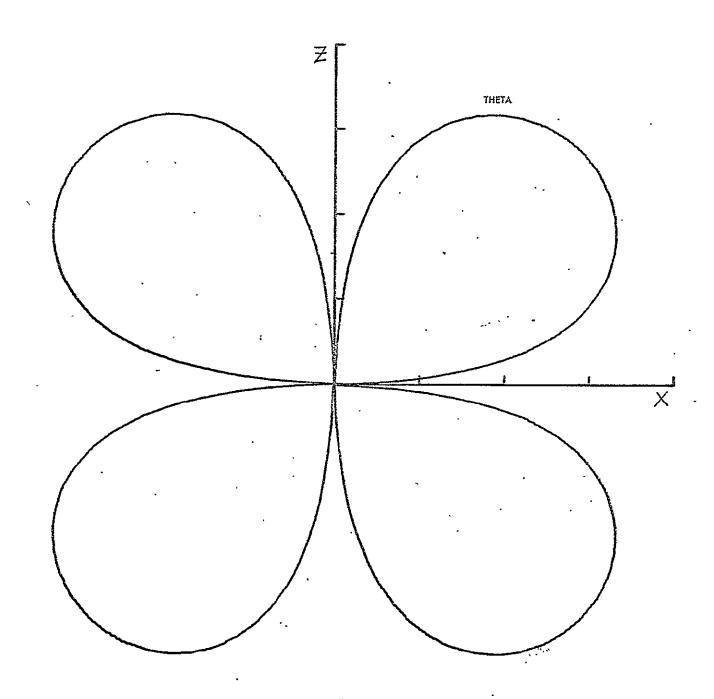


FIGURE D-8

FREQUENCY (MHZ) 4.70

V-ANT. LENGTH (FT) DI POLE ALONE

MODE UNBALANCED

DB MAX +2.7

DB MIN -17.3

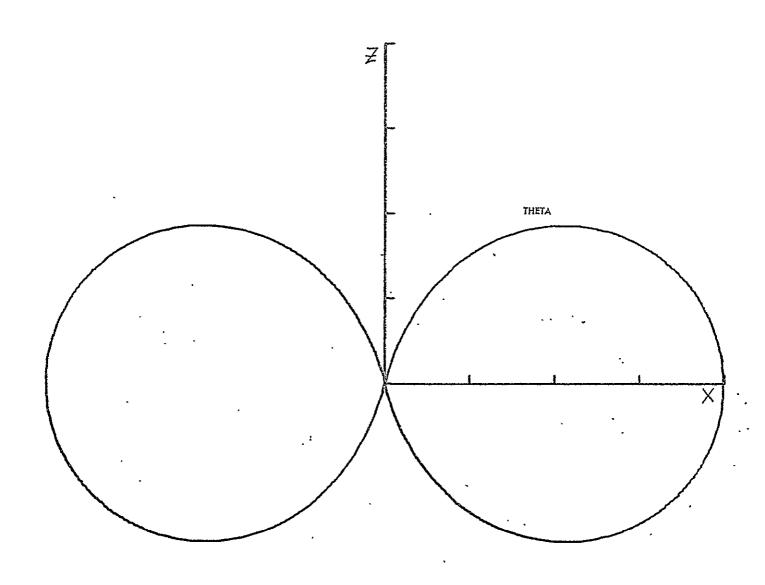


FIGURE D-9

FREQUENCY (MHZ) 6.55

V-ANT. LENGTH (FT) DIPOLE ALONE
MODE BALANCED
DB MAX +2.8
DB MIN -17.2

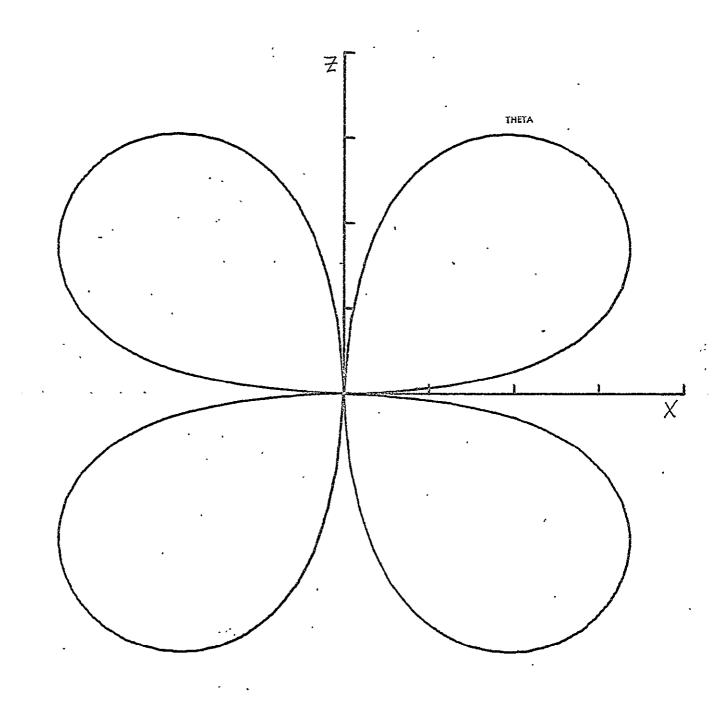


FIGURE D- 10

FREQUENCY [MHZ] 6.55

V-ANT. LENGTH (FT) DI POLE ALONE
MODE UNBALANCED
DB MAX +2.8
DB MIN -17.2

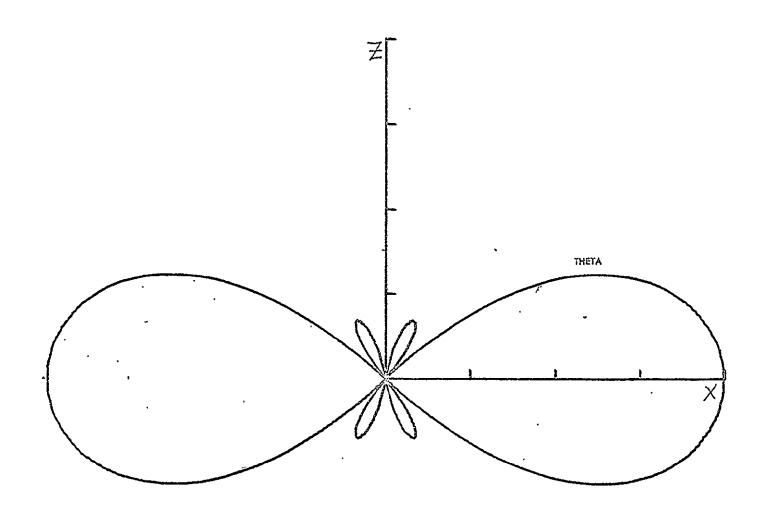
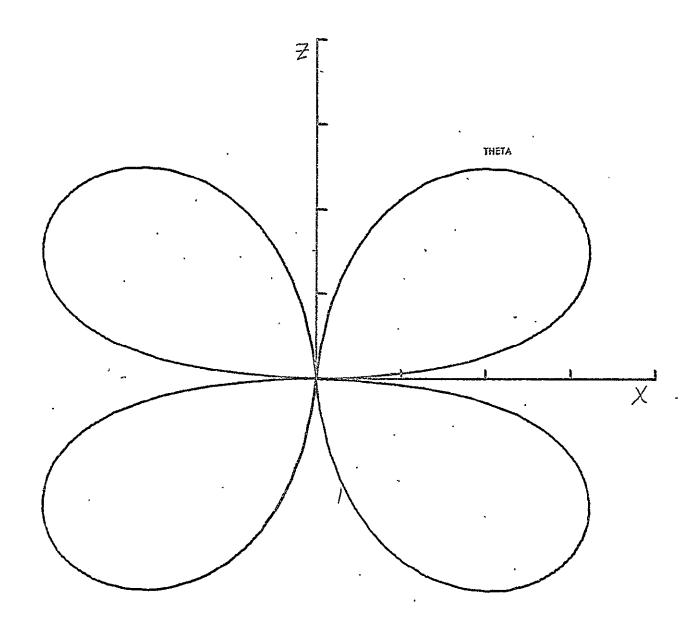


FIGURE D-//
FREQUENCY [MHZ] 9.18
7-ANT. LENGTH [FT] DI POLE ALONE
MODE BALANCED
DB MAX +4.4
DB MIN -15.6



FREQUENCY [MHZ] 9.18
V-ANT. LENGTH [FT] DIPOLE ALONE
MODE UNBALANCED
DB MAX +4.4
DB MIN -15.6

APPENDIX E

CURRENT DISTRIBUTIONS FOR ORTHOGONAL DIPOLES

See Appendix A for discussion

- NOTE 1: Wires 1 through 6 represent the driven dipole,
 . 7 through 9 the parasitic dipole.
- NOTE 2: Excitation mode 1 in this listing is the unbalanced mode.

ANTENNA/SCATTERING PROGRAM WIRA

TCI.2236 · NASA ORTHOGONAL DIPOLES INTERPOLATION SCHEME 1

NUMBER OF WIRES 9 ' ' THE X-Z PLANE IS A MAGNETIC PLANE WIRE CONDUCTIVITY INFINITE

WI	RE	COORDINATES	IN FEET	AND	WIRE	RADII	IN	INCHES	

WIRE N	۷0			X1	, Y1	Zl	RADI		X2	Y2	SS	ŘAD2	INTERVALS
	1	GAP	-1	-0.0000	-0.0000	-0.0000	.250000		-0.0000	-0.0000	5.0000	.250000	. 1
	2	07.	-	-0.0000	-0.0000	5.0000	.250000	• •	-0.0000	-0.0000	15.0000	.250000	1
·	3			-0.0000	-0.0000	15.0000	.250000		-0.0000	-0.0000	61.5000	.250000	, 3
	4	GAP	2	-0.0000	-0.0000	-0.0000	.250000	*** ** * * * * * * * * * * * * * * * *	-0.0000	-0.0000	-5.0000	.250000	1
	5	-		-0.0000	-0.0000	-5.0000	.250000		-0.0000	-0.0000	-15.0000	.250000	1
	6		•	-0.0000	-0.0000	-15.0000	.250000		-0.0000	-0.0000	-61.5000	.250000	3
	7	GAP	3	-0.0000	-0.0000	-0.0000	-250000		-0.0000	5.0000	-0.0000	.250000	1
	8	• • • •		-0.0000	5.0000	-0.0000	.250000		-0.0000	15.0000	-0.0000	.250000	1
	9			-0.0000	15.0000	~0.0000	.250000		-0.0000	61.5000	-0.0000	.250000	3

NO GROUND PRESENT

, MAXIMUM RELATIVE ASYMMETRY IN THE ANTENNA ADMITTANCE MATRIX IS .0 PER CENT FOR GAPS

EXCITATION MODE 1

GAP SOURCES

GAP	. EMF VOLT	EMF DEGREES	OHM,	MICRO HENRY	PICO FARAD	,	•
	1000.0000	• • • •	-0.0000 -0.0000	-0.0000	INFINITÝ INFINITY		SERIES SERIES

				COOPDINA	TES	CURRENT DISTRIBUTION						NORMAL EL FIELD # F	
			х	Y	Z		AMPL [TUD	Ε	, *	PHASE		•	
	WIRE NO	INT NO .	WAVE- LENGTHS	WAVE- LENGTHS	WAVE- LENGTHS	AMP	AMP	AMP	DEG	DEG ,	DEG	VOLTS	DEG ;
			0.0000	0.0000	0000	GAP 1			GAP 1	•		144.123	.0
	1	1.	.0.0000	0.0000	.0056	1.3631	1.2850	1.2195	90.0	90.0	90.0	122.693	0
	2	2	0.0000	0.0000	.0224	1.2316	1.1266	1.0241	90.0	90.0	90.0	88.758	0
	2	3	0.0000	0.0000	.0509	1.0284	.8714	•7100	90.0	90.0	89.9	87.951	0
	3. 3	4	0.0000	0.0000	•0855	•7128	.5461	•3734	89.9	89.9	89.9	93.717	0
	3	5	0.0000	0.0000	.1201	•3795	1967	.0000	89.9	89.9	-90.3	104.797	1
			0.0000	0.0000	.0000	GAP 2	•		GAP 2			144.123	• 0
	4	6	0.0000	0.0000	0056	1.3631	1.2850	1.2195	90.0	90.0	90.0	122.693	0
	5	7	0.0000	0.0000	0224	1.2316	1.1266	1.0241	90.0	90.0	90.0	88.758	0
	6	8	0.0000	0.0000	0509	1.0284	.8714	.7100	90.0	90.0	89.9	87.951	0
	6	9	0.0000	0.0000	0855	.7128	•5461	•3734	89.9	89.9	89.9	93.717	0
	6	10	0.0000	0.0000	1201	•3795	.1967	.0000	89.9	89.9	-90.3	104.797	1
			0.0000	0000	0.0000	GAP 3			GAP 3			144.123	-180.0
	7	13	0.0000	.0056	0.0000	1.3631	1.2850	1.2195	-90.0	-90.0	-90.0	122.693	180.0
	8	12	0.0000	.0224	0.0000	1.2316	1.1266	1.0241	-90.0	-90.0	-90.0	88.758	180.0
ы	9	13	0.0000	.0509	0.0000	1.0284	.8714	.7100	-90.0	-90.0	-90.1	87.951	180.0
	9	14	0.0000	.0855	0.0000	.7128	.5461	.3734	-90.1	-90.1	-90.1	93.717	180.0
•	9	15	0.0000	.1201	0.0000	.3795	.1967	•0000	-90.1	-90.1	89.7	104.797	179.9

IMPEDANCE DATA

GAP NO	INPUT RESIST. OHMS	INPUT REACT. OHMS.	INPUT CONDUCT. MHOS	INPUT SUSCEPT. MHOS	LOAD RESIST. OHMS	LOAD REACT. OHMS	GAP RESIST. OHMS	GAP REACT. OHMS	GAP VOLT VOLT D	•
1	.408 .408	-733.652 -733.652	.000001	.001363 .001363	0.000 0.000	0.000	.408 .408	-733.652 -733.652	1000.000	0.0

INPUT POWER = 1.516 WATTS
RADIATED POWER = 1.516 WATTS
WIRE LOSS = .000 WATTS
NETWORK LOSS = 0.000 WATTS
RADIATION EFFICIENCY = 100.00 PER CENT

```
06/23/70
                                                 FREQUENCY = (1) 2.8000 MC (11)
                                                                                            morning appearance
                                                                          Sign It is
                RELATIVE ASYMMETRY IN THE ANTENNA ADMITTANCE MATRIX IS
                                                                           .0 PER CENT FOR GAPS 2 AND
                                            ALMATT TOTAL A FOR A GARAGE
                                                                       90.0
                                              "EXCITATION MODE 1
                                           GAP SOURCES
                                                                        2011 211
                                                                        45 0
                                              EMF OH
                                                               ,MICRO
                                                                       PICO . . .
                                                                      FARAD
                                   VOLT
                                                               HENRY
                                                              -0.0000 INFINITY ( ))
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                           1 1000:0000
                                            -0.00 --0.0000
                                                                                     SERIES . .
                            2 1000.0000
                                                             -0.0000 INFINITY...
                                                                 104
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                                                           CURRENT DISTRIBUTION
                                                                                           NORMAL ELECTRIC
                                                                                           FIELD * RADIUS
                                        AMPLITUDE ( )
                                                       AMP . .
              WAVE-
                        WAVE-
                                             AMP_
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                                                                               DEG
                                                                                      DEG
                                                                                              VOLTS
                                                                                                      DEG
WIRE INT
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                      LENGTHS
                                LENGTHS
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                                                    1.5009
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                       0.0000
                                  .0647
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                                                   . 9631
                                           1.2440
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                                                                       89.8
                                                                              89.8
                                                                                     89.7
                                                                                            126.085
   3
             0.0000
                       0.0000
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                                            .6744
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                                 -.0284
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                                                                                     89.8
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                                 -.0647
                                 -.1088
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-90.2

125.411

98.651

109.175' 179.9

180.0

180.0

2.0140

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1.2396

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	14 15	0.0000		. 0.0000	1.2440 ··· .6744	. •9631- •3513	.6636 "n=90.2	-90.2 -90.3	-90.3 126.08 89.2 146.52	179.8 179.7	
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NO	RI	ESIST. OHMS	REACT.	CONDUCT.	SUSCEPT.	RESIST.	REACT.	RESIST.	REACT.	VOLT D	AEGDEEC
-		UMMS	. OHMS	MRUS .	MHUS		ониѕ	บกคร	OHMS	VOLT D	ZUREES
1 2		1.217	454.389 454.389	.000006	002201	0.000 0.000	0.000	1.217 1.217	-454.389 -454.389		0.0
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			,	• .]	INPUT POWER	_ = . · ·	11:787 WATT	Soico			
	•	•		· · · F	RADIATED POWE	ER =	11:787 WATT 11:787 WATT .000 WATT	S 1 114			
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			COORDINA	τες	*** ** * *******		CURRENT C)ISTRIBUT	ION	•	. NORMAL EL FIELD * F	
		· x	Y	Z	***************************************	`AMPLITUD	ε ΄ ΄	<i>:</i> .	PHASE			
WIRE NO	INT NO	WAVE- LENGTHS	WAVE- LENGTHS	WAVE- LENGTHS	AMP	AMP	AMP	DEG	DEG	DEG.	' VOLTS	DEG
		0.0000	0.0000	0000	GAP 1			GAP 1			150.041	 3
1	1	0.0000	0.0000	.0100	19.2405	19.0660		82.4	82.3	82.3	185.657	
. 2	2	0.0000	0.0000	.0399	18.8808	18,3213	17.5173	82.3	82.2	82.1	327,119	-5.9
3	3	0.0000	0.0000	.0908	17.5372	15.8185	13.5468	82.1	82.0	82.0	619.651	-7.2
3	4	0.0000	0.0000	. 1527	13.5829	10.8077	7.5975	81.9	81.8	81.8	929.372	-7.8
3	5	0.0000	0.0000	-2146	7.7216	4.0733	•0000	81.7	81.6	-100.4	1198.957	-8.3
	e	0.0000 0.0000	0.0000	.0000 0100	GAP 2 19.2405	19.0660	18.8540	GAP 2 82.4	82.3	82.3	150.041 185.657	3 -2.7
4 5	6 7	0.0000	0.0000	0399	18.8808	18.3213	17.5173	82.3	82.2	82.1	327.119	-5.9
6	á	0.0000	0.0000	0908	17.5372	15.8185	13.5468	82.1	82.0	82.0	619.651	-7.2
6	9	0.0000	0.0000	1527	13.5829	10.8077	7.5975	81.9	81.8	81.8	929.372	-7.8
6	10	0.0000	0.0000	2146	7.7216	4.0733	0000	· 81.7		-100.4	1198.957	-8.3
,	- 0	0.0000	0000	0.0000	GAP 3			GAP 3	0.,0		150.041	179.7
7	11	0.0000	.0100	0.0000	19.2405	19.0660	18.8540		-97.7	-97.7	185.657	177.3
8	12	0.0000	.0399	0.0000	18.8808	18.3213	17.5173	-97.7	-97.8	-97.9	327.119	174.1
9	13	0.0000	.0908	0.0000	17.5372	15.8185	13.5468	-97.9	-98.0	-98.0	619,651	172.8
9	14	0.0000	.1527	0.0000	13.5829	10.8077	7,5975	-98.1	-98.2	-98.2	929.372	172.2
9	15	0.0000	.2146	0.0000	7.7216	4.0733	.0000	-98.3	-98.4	79.6	1198.957	171.7
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INPUT POWER = 5104.201 WATTS
RADIATED POWER = 5104.201 WATTS
WIRE LOSS = .000 WATTS
NETWORK LOSS = 0.000 WATTS
RADIATION EFFICIENCY = 100.00 PER CENT

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WIRE NO	INI NO		WAVE- LENGTHS	WAVE-	AMP	AMP	AMP .	DEG	DEG	DEG VO	LTS DEG	7	
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•		*	<u>.</u> ,			IMPEDANCE	E DATA ""	* ·			;		
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			e eservita 7 es	* * * * *	FR	REQUENCY =	615500	'M¢'''!!	****** 	_	a cycone. Firethic		
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		MAXÌMUH REL	 ATÌVE ÀSYI	• •		NO GROUNG		•	. ", , , , , , , , , , , , , , , , , , ,	nra vo NT FOR GAPS	is ore 2 AND J		
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		•	4 92.5 + + *r	COORDINA	TĘS " () .)	1.7:15		CURRENT D	ISTŔĬŖÚT	10N,	711.7	NORMAL EL		
	•		x	. T	Ž		AMPLITUD	Ε .	• •	PHASE	*			
•	WIRE NO	INT NO	WAVE-		WAVE-	AMP	AMP	AMP	DEG	DEG	DEG	VOLTS	DEG "	
- 1	1 2 3 3 3 3 4 5 6 6 6 6 7 8 9 9 9	1 2 3 4 5 . 6 7 8 9 10 11 12 13 14 15	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	0000 .0166 .0665 .1514 .2545 .3577 .0000 0166 0665 1514 2545 3577 0.0000 0.0000 0.0000 0.0000	.9014 GAP 2 .4162 .7741 1.1848 1'.3285 .9014 GAP 3 .4162 .7741 1.1848	.6340 1.0161 1.3329 1.1748 .4958 .6340 1.0161 1.3329 1.1748 .4958 .6340 1.0161 1.3329 1.1748 .4958	1.1960 1.3296 .8874	" -88.8 "64P" 3	-89,•5,	-86.9 -88.7 -79.3 -79.8 -84.0 -86.9 -88.7 -79.3	143.740 117.130 '67.041 '14.905 '41.683 84.931 '143.740 117.130 62.041 14.905 41.683 84.931 143.740 117.130 62.041 14.905 41.683 84.931	0 4 -2.6 -19.2 -173.5	•
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NO GROUND PRESENT MAXIMUM RELATIVE ASYMMETRY IN THE ANTENNA ADMITTANCE MATRIX IS .0 PER CENT FOR GAPS 2 AND App 1 103.700 -- 9 三百万。1366年,《春 (79.451 - Oliver 了"我们的最后,我们还 CONTRACTOR OF SIGN T 14,711 TO 15 4.434.740 19 GAP SEMF 1 1000.0000 -0.00 -0.0000 -0.0000 INFINITY: " '0.0 SERIES' '0 1/1. 2 1000.0000 -0.00 1-0.0000 1-0.0000 PINFINITE 1... 61,803 155 CURRENT DISTRIBUTION NORMAL ELECTRIC AMPLITUDE ' .T. PHASE WAVE- AMP AMP DEG DEG WIRE INT WAVE-WAVE-7. Au 7.611 20E 12 L'ENGITHS ... GAP NO NO LENGTHS "LENGTHS 0.0000 -0.0000 -.0000 GAP 1 ibi masa 👢 OF ALLE ort, · 01444.858 - - 11 1.1181 .8027 .5451 73.8 67.4 56.6 127.182 -1.1 0.0000 .0233 0.0000 . 0.0000 -- 10.0000 -- 40.0933 -- 40.5910 -- 2730 -- 4433 -- 1059.5 -- 10.000 -- 59.91 -- 93.068 -- 10.000 . .5 . 2122 - 44237 1.2257 "-58.8 -81.9 -88.4 60.335" -12.1 0.0000 .9083 0.0000 1.2168 _1.2750 1.0641 ~91.8 -94.0 12.815 -145.7 0.0000 .3568 -88.5 0.0000 .6241 73.803 . 176.0 0.0000 .5013 1.0793 .0000 -94.0 -95.7 . 78.5 5 0.0000 . • 0000 mm (GAP) 12: 144.858 0.0000 2011-1176AR 112 0.0000 -.0233 ": 1.1181 " .8027 67.4 56.6 127.182 -1.1 0.0000 0.0000 .5451 / . . 73.8 6 .2730 9.7 -59.9 93.068 -5.0 0.0000 -.0933 -5910 · •4433 on 59•5 0.0000 -.2122 | w.4237 . . 9083 1.2257 ... -58.8 -81.9 -88.4 60.335 -12.1 0.0000 0.0000 12.815 -145.7 1.2168 1.2750 1.0641 '-88.5' -91.8 -94.0 -.3568 0.0000 0.0000 9 .0000 73.803 176.0 0.0000 0.0000 -.5013 1.0793 .6241 -94.0 -95.7 144.858 179.9 GAP 3 0.0000 -.0000 0.0000 GAP 3 .8027 .5451 -106.2 -112.6 -123.4 127.182 178.9 11 .0233 0.0000 1.1181 0.0000

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APPENDIX F

RADIATION PATTERNS FOR ORTHOGONAL DIPOLES

Patterms in two principal planes are sufficient. See Appendix B for further discussion.

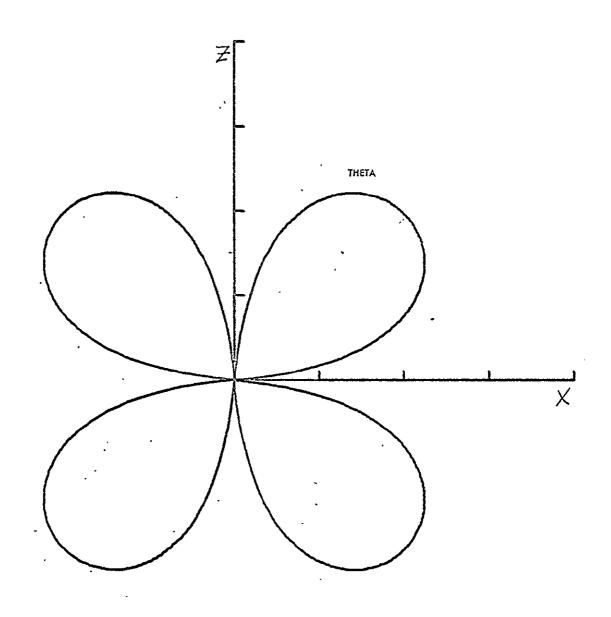


FIGURE F-1

FREQUENCY [MFIZ] .202-2.20

V-ANT. LENGTH [FT] ORTHO. DIPOLES

MODE UNBALANCED

DB:MAX + 3.7

DB MIN -16.3

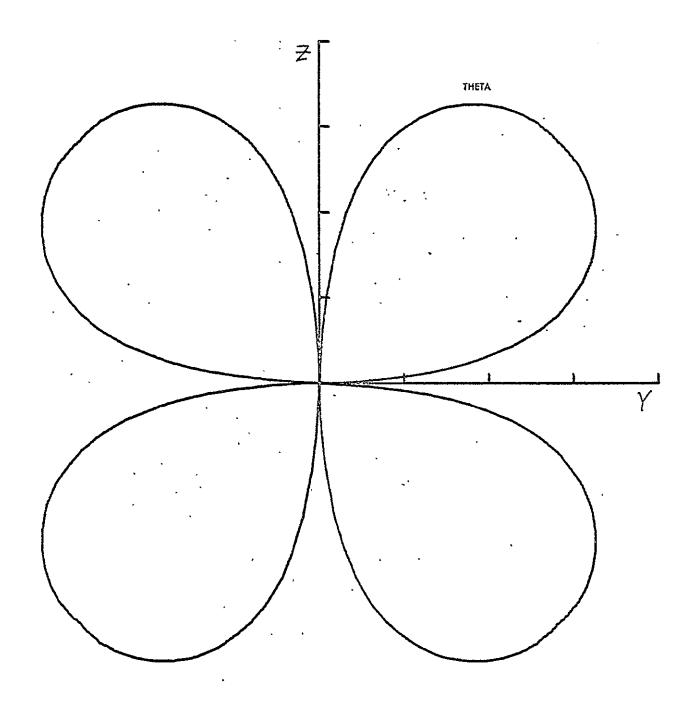


FIGURE F-2

FREQUENCY (MHZ) .202-2.20

Y-ANT. LENGTH (FI) ORTHO. DIPOLES

MODE UNBALANCED

DB MAX +3.7

DB MIN -16.3

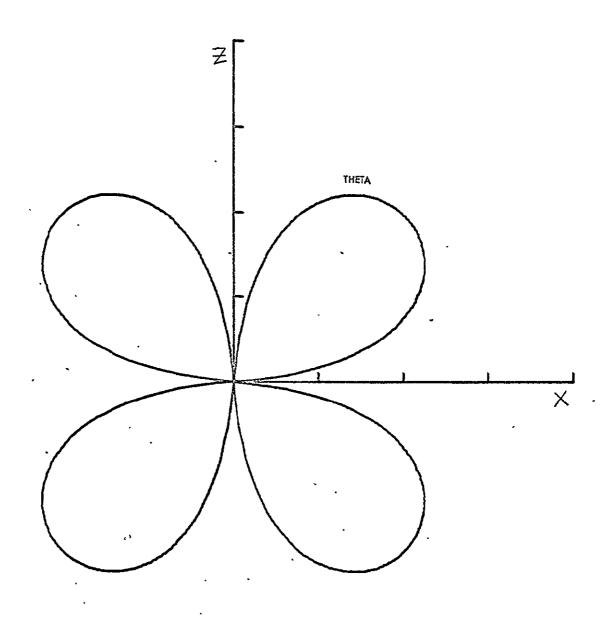


FIGURE F-3

FREQUENCY (MHZ) 2.80

V-ANT. LENGTH (FI) ORTHO. DIPOLES

MODE UNBALANCED

DB MAX +3.6

DB MIN -16.4

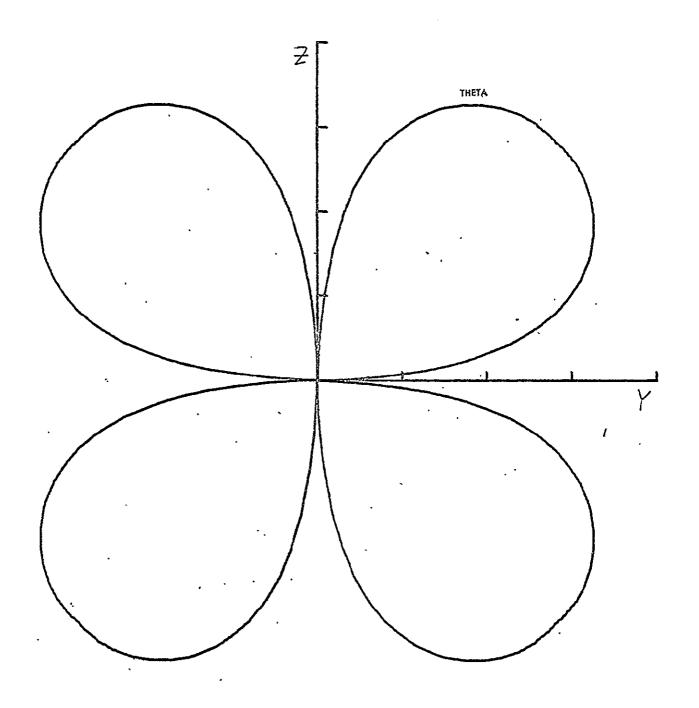


FIGURE F - A

FREQUENCY (MHZ) 2.80

V-ANT. LENGTH (FT) ORTHO. DIPOLES

MODE UNBALANCED

DB MAX + 3.6

DB MIN - 16.4

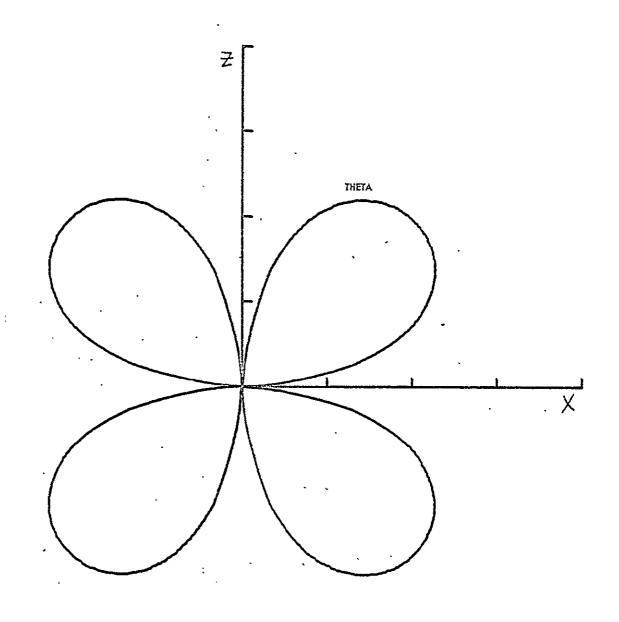


FIGURE F-5

FREQUENCY (MHZ) 3.93

V-ANT. LENGTH (FT) ORTHO. DIPOLES

MODE UNBALANCED

DB MAX +3.6

DB MIN -16.4

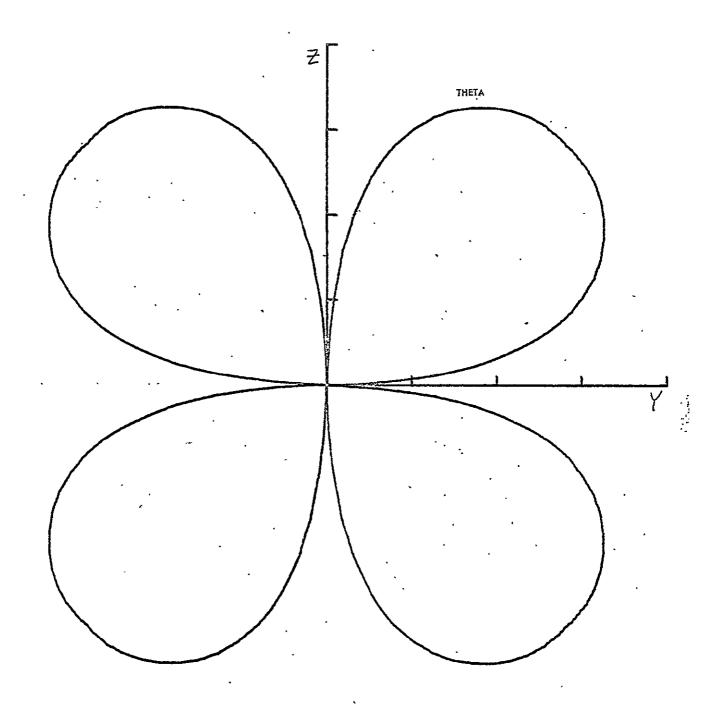


FIGURE F-6

FREQUENCY (MHZ) 3.93
V-ANT. LENGTH (FT) ORTHO. DIPOLES
MODE UNBALANCED
DB MAX +3.6
DB MIN -16.4

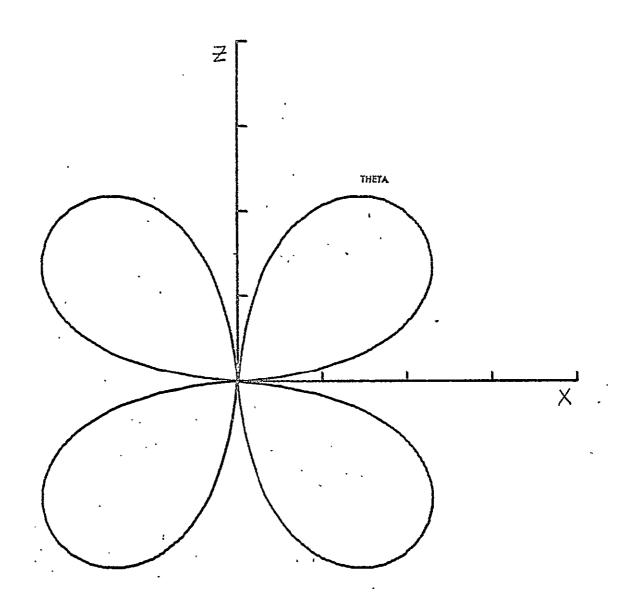


FIGURE F-7

FREQUENCY (MHZ) 4.70

V-ANT. LENGTH (FT) ORTHO. DIPOLES

MODE UNBALANCED

DB MAX + 3.5

DB MIN -16.5

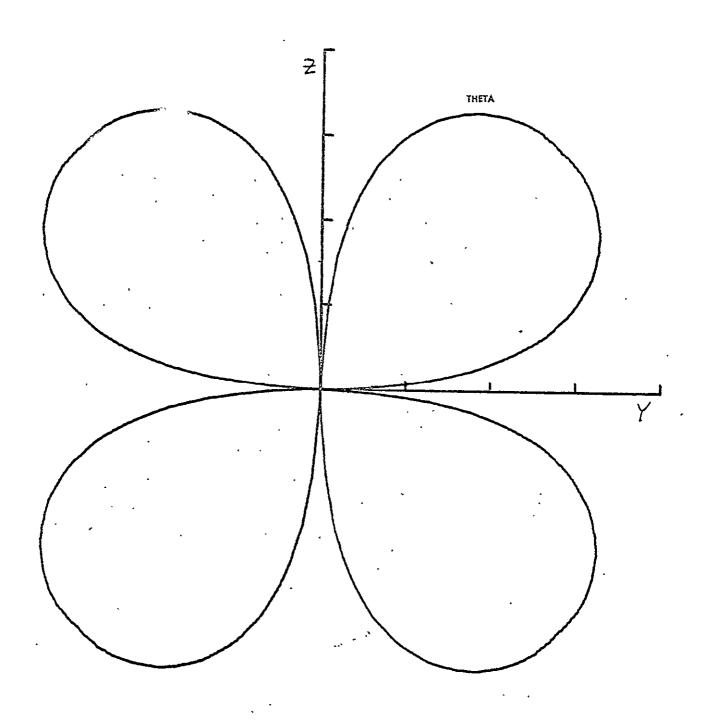


FIGURE F-8

FREQUENCY (MHZ) 4.70

V-ANT. LENGTH (FT) OR THO. DIPOLES

MODE UNBALANCED

DB MAX +3.5

DB MIN -16.5

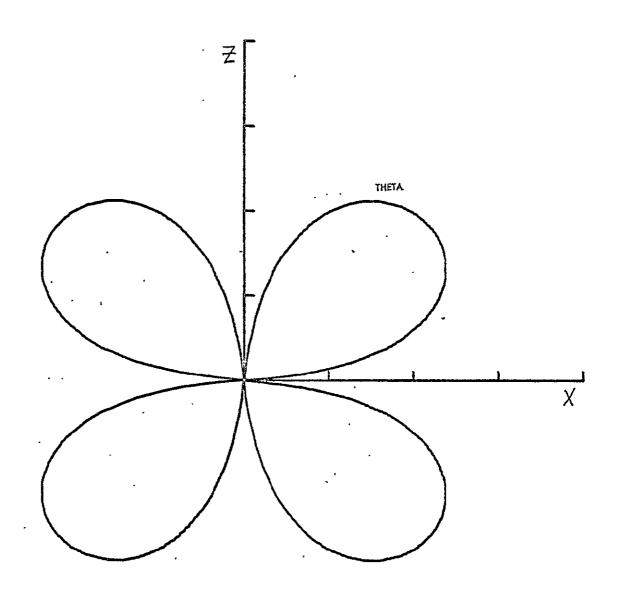


FIGURE F-9

FREQUENCY (MHZ) 6.55

V-ANT. LENGTH (FT) ORTHO. DIPOLES

MODE UNBALANCED

DB MAX +3.3

DB MIN -16.7

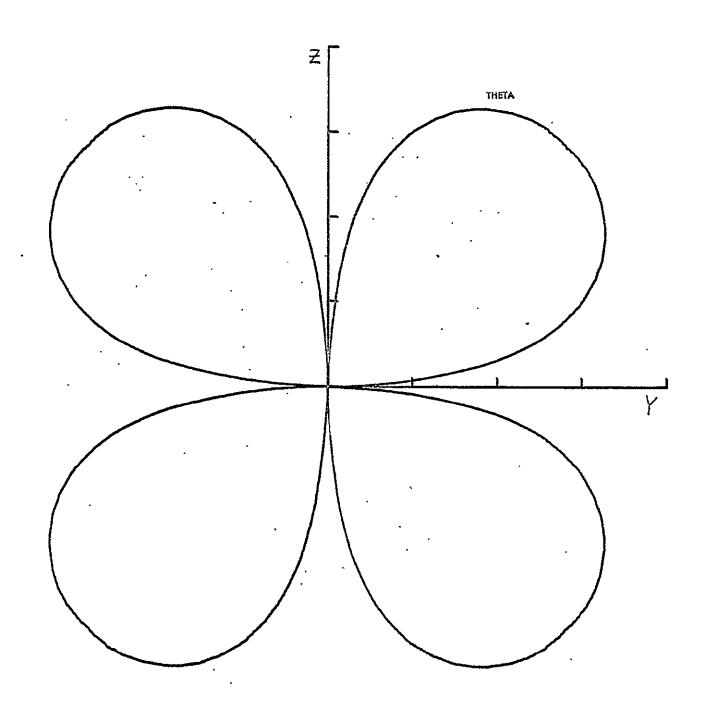


FIGURE F- 10

FREQUENCY (MHZ) 6.55

V-ANT. LENGTH (FT) ORTHO, DIPOLES

MODE UNBALANCED

DB MAX +3.3

DB MIN -16.7

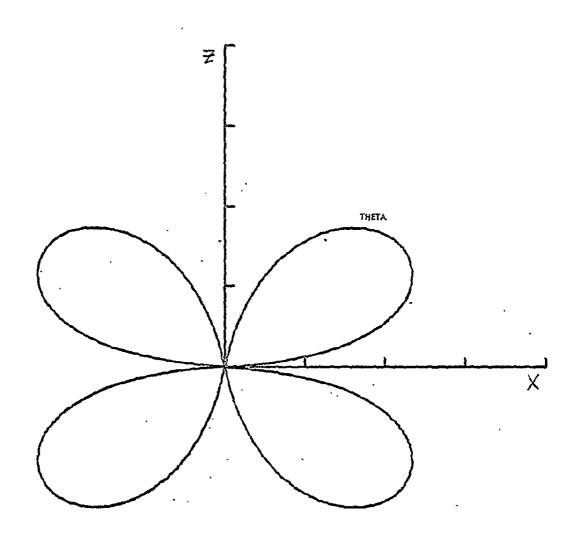


FIGURE F-11

FREQUENCY (MHZ) 9.18

V-ANT. LENGTH (FT) ORTHO, DIPOLES

MODE UNBALANCED

DB MAX +4.4

DB MIN -15.6

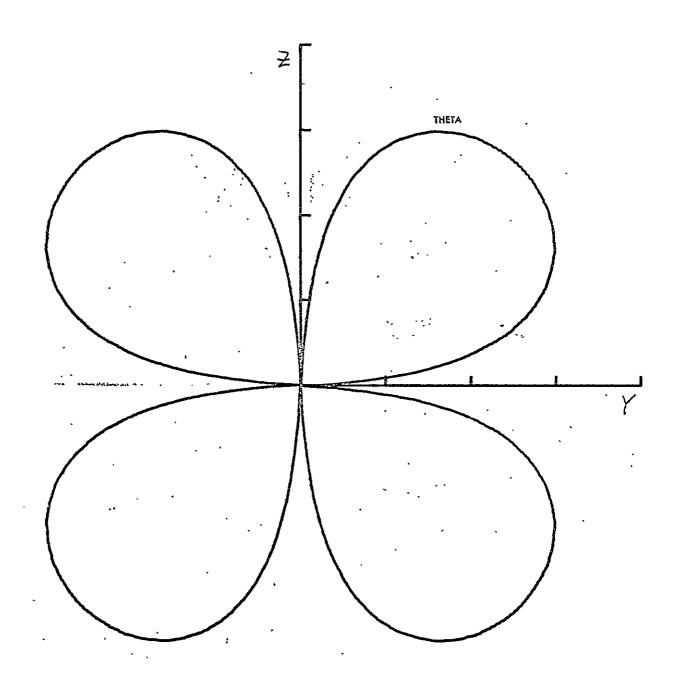


FIGURE F- | 2

FREQUENCY [MHZ] 9.18

V-ANT. LENGTH (FT) ORTHO. DIPOLES

MODE UNBALANCED

DB MAX +4.4

DB MIN -15.6